



## ***GENERAL PLAN***

***1995 - 2014***

### **VOLUME II:**

### **Final Technical Appendix**

- PART 1 - Technical Memo on Major Constraints**
- PART 2 - Town of Truckee Technical Noise Study**
- PART 3 - Technical Analysis of the Draft General Plan**
- PART 4 - Traffic Analysis**
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**Adopted February 15, 1996  
by Town Council Resolution No. 96-08**

**Town of Truckee  
Community Development Department,  
Planning Division  
11570 Donner Pass Road  
Truckee, CA 96161  
(916) 582-7876**

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**TOWN OF TRUCKEE  
GENERAL PLAN  
and  
ENVIRONMENTAL IMPACT REPORT**

**1995-2014**

**VOLUME II:  
Final Technical Appendix**


**Part 1 - Technical Memo on Major Constraints**

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# **TOWN OF TRUCKEE GENERAL PLAN and ENVIRONMENTAL IMPACT REPORT**

## **VOLUME II: Final Technical Appendix**

### **Part 1 - Technical Memo on Major Constraints**

With the completion of the initial phases of the General Plan work program, we now move into Task 3, Preparation of the General Plan. In this phase we will be developing the General Plan Land Use Plan and the rest of the General Plan elements, as well as all of the General Plan Diagrams. A critical next step in this process is the identification of constraints. The nature and extent of the identified constraints will be important considerations in the development of the General Plan Land Use Plan, which will designate future land uses. Other issues still to be considered in the preparation of the Land Use Plan, including visual and aesthetic issues, community needs for various types of land uses, Town goals, and coordination of land uses. While these kinds of issues are very important, they are different from physical and environmental constraints, which address limits on types or amounts of land uses in certain areas. This section addresses those physical and/or environmental constraints.

There are two constraints on future development. The Planning Center has identified which will be considered in the preparation of the Truckee General Plan. Constraints identified are based on current studies and reports and additional studies completed by the project team. The Truckee Hydrology Study, the outcome of the effort to assess and analyze groundwater in the region.

Constraints identified include areas of potential wildfire hazard or corridors, areas of steep slopes, Agricultural Resources Areas, traffic and transportation corridors, 100-year flood plain areas, Forest Service lands, areas subject to erosion, lands, and parkland resources. We have identified the areas within the Town limits affected by these constraints, and these areas are described in this memo.



# *TRUCKEE GENERAL PLAN*

## **TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS**

*May 19, 1994*

**TO:** *Town of Truckee*

**FROM:** *The Planning Center*

**SUBJECT:** *Major Constraints to be Considered in the Preparation of the General Plan*

### **Introduction**

With the completion of the initial phases of the General Plan work program, we now move into Task 3, Preparation of the General Plan. In this phase we will be developing the General Plan Land Use Plan and the text of the General Plan elements, as well as all of the General Plan Diagrams. A critical initial step in this process is the identification of constraints. The nature and extent of the identified constraints will be important considerations in the development of the General Plan Land Use Plan, which will designate future land uses. Other issues will be considered in the preparation of the Land Use Plan, including visual and aesthetic issues, community needs for certain types of land uses, Town goals, and coordination of land uses. While these kinds of issues are very important, they are different from physical and environmental constraints, which represent limits on types or amounts of land uses in certain areas. This memo addresses those physical and environmental constraints.

This memo summarizes the major constraints The Planning Center has identified which must be considered in the preparation of the Truckee General Plan. Constraints identification was based on existing studies and reports and on additional technical analysis completed by the project team. The attached Bibliography lists the sources of the information and analysis summarized in this memo.

Constraints identified include areas of potential wildlife habitat or corridors, areas of steep slopes, Aggregate Resource Areas, traffic and circulation constraints, 100-year flood plain areas, Forest Service lands, areas subject to existing noise, and geologic hazards. We have identified the areas within the Town limits affected by these constraints, and these areas are described in this memo.



## **TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS**

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### **Mineral Resources**

The State of California, through the State Geologist, has identified areas of mineral resources for Nevada County, including Truckee. This information is documented in the 1990 Mineral Land Classification. Almost all of Truckee is considered to contain sand and gravel or crushed stone resources. The State considers sand and gravel and crushed stone resources to be significant resources in limited supply. The General Plan is required by State law to recognize the mineral information classified by the State Geologist, to assist in the management of land use which affect areas containing significant resources, and to emphasize the conservation and/or development of identified mineral deposits.

The State has identified those areas, including areas within the Town of Truckee, that it considers available for extraction of the resources as Aggregate Resource Areas (ARAs). The ARAs cover most of the Truckee River from east of Downtown northeast to the Town limits, and most of the area south of the river and east of the airport extending to the Town limits on the south and the junction of the Truckee River and Martis Creek to the north.

The Aggregate Resource Areas should be considered for conservation and development of mineral resources. Land uses compatible with mineral resource conservation and/or extraction should be considered for these areas.

### **Topography and Geologic Hazards**

Some portions of Truckee contain areas of very steep slopes. Generally, areas over 30 percent slope are considered to be very steep and therefore too steep for development. Areas with slopes of 30 percent or greater include the areas along the Truckee River, the ridges and hillsides north and west of Downtown, the ridges north of Gateway and north and west of Donner Lake, and the areas on and around Alder Hill.

Areas of 30 percent or greater slope should be considered for Open Space uses. Where isolated pockets of flat land are located within areas of very steep slopes, very low density clustered development may be appropriate if access is available. Where the pockets of flat land are completely surrounded by very steep land, roads meeting emergency access standards may not be possible and development would not be appropriate.

Geologic hazards in the Truckee area consist of earthquakes and landslides. The



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Boca/Truckee and Dog Valley Faults are located near Truckee, and a number of small fault traces have been identified within the Town limits. None of these faults have been designated as Alquist-Priolo Special Study Zones, a designation used by the State of California to identify significant hazard zones along faults. The identified faults, along with the potential for damage from earthquakes in the Truckee area have been studied by the state. Mines and Geology has conducted general geologic studies of the region, while the state Board of Reclamation, which operates dams in the area, has studied the faults in the Truckee area in more detail. The conclusions of the studies are that the potential for strong groundshaking from the faults in the area is not considered great, and that the potential for damage is also not high. The potential for seiche (flooding in areas surrounding lakes as a result of earthshaking) was also studied and found to be minimal. The existing Truckee Building Code requirements for seismic safety are considered sufficient to prevent earthquake damage. No areas in Truckee are considered constrained due to earthquake hazard.

Landslide hazard can result from weak soils on steep slopes as well as from earthshaking. Landslide hazard has not been studied for any part of Nevada County, and it is not possible therefore to identify specific areas subject to landslide hazards. The information available concerning potential earthshaking indicates that landslides on gentle slopes, or liquefaction (earth movement on flat lands due to earthshaking and weak soils), represent minimal hazards. Given the lack of evidence to the contrary, landslide hazard should be considered a constraint in all areas of very steep slopes.

### **Other Hazards**

#### *Fire Hazard*

The entire Truckee area is considered to be in a high fire hazard zone. Fire hazard should therefore be considered a constraint to some extent for all of Truckee, and especially to development in remote forested areas. No areas should be designated for development unless adequate emergency access and fire flow can be provided. In addition, the Town's development policies should require compliance with Fire District requirements and guidelines for defensible space and fire resistant landscaping.

#### *Snow Avalanche Hazard*

Some areas of Truckee, particularly in the western portion of the Town, are considered high snow avalanche hazard areas. While existing Truckee Building



## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

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Code requirements for these areas address snow-load concerns for structures, these areas should be considered to be constrained for development of new year round uses.

### **Flooding**

The Federal Emergency Management Agency (FEMA) has identified areas subject to flooding in the event of the 100-year flood. These areas are located around Donner Lake, along the banks of the Truckee River, and along Coldstream Creek. In a few areas along the Truckee River, more extensive flooding in the event of a storm of greater intensity than the 100-year flood could occur, up to 300 feet from the banks of the Truckee River.

Flooding is a major constraint around Donner Lake and in the areas along the Truckee River. The areas subject to flooding around Coldstream Creek are smaller, but these areas are also constrained. These areas are generally not considered appropriate for residential land uses. For development proposals in areas subject to flooding in the event of the 100-year flood, more detailed study of flood hazards should be required as a part of development design and approval. In addition, since construction within the 100-year flood plain can have an effect on the size of the flood plain (blocking flood waters in one area can cause them to spread further in another area), new construction in the flood plain should be limited unless it can be shown that it will not increase flood hazards in other areas.

### **Natural Resources**

The Truckee area supports a variety of plant and wildlife habitats considered important and unique by state and federal resource agencies. Some of these habitats are inhabited by threatened or endangered species or by species that are considered candidates for listing as threatened or endangered (Table 1), other species of concern (Table 2), or have important biological resource value (Table 3) such as the Loyalton-Truckee deer herd.

The tables on the following pages list species in these categories for which habitat exists in Truckee. In some cases, the species themselves have been found to exist in Truckee. In other cases, while the habitat is found in Truckee, the species have not been observed in Truckee. The existence of any of these species, or of their habitat, may represent a potential constraint, since federal or state regulations may constrain land uses.

The information in these tables is based on review of database information and state



## **TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS**

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and federal listings, and of the various studies of biotic resources that have been previously conducted in the area. Development of a definitive database on biotic resources is not within the scope of the General Plan work effort, however, identification of areas of concern will allow development of appropriate land use designations and policies for the General Plan.

## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

**Table 1. Threatened, Endangered, and Candidate Species  
Occurring in Truckee**

Species	Occurrence in Truckee
<b>FISH &amp; WILDLIFE</b>	
<i>Accipiter gentilis</i> (northern goshawk)	This federal Candidate C2 <sup>1</sup> species usually nests near water on north-facing slopes in red fir, lodgepole pine, jeffrey pine, and aspen stands.
<i>Gulo gulo</i> (wolverine)	This federal Candidate C2 and state threatened species has been sighted occasionally in Central and Eastern Nevada County. Wolverines prefer mixed conifer forests from mid to high elevations.
<i>Oncorhynchus clarki henshawi</i> (Lahontan cutthroat trout)	This federal threatened fish species occurs within Truckee only in Martis Creek, but formerly lived in all accessible waters of the Lahontan Basin. This trout cannot tolerate the presence of other salmonids. The species requires gravel riffles in streams for spawning.
<i>Vulpes vulpes necator</i> (Sierra Nevada red fox)	This federal Candidate C2 and state threatened species occurs only in high elevations of the Sierra Nevada. The entire Truckee area represents potential habitat for this subspecies of red fox although there are no reported occurrences.
<b>PLANTS</b>	
<i>Eriogonum umbellatum torreyanum</i> (Donner Pass buckwheat)	Several populations of this federal Candidate C2 species were recently rediscovered on steep slopes and ridgetops between 6,900 and 8,600 feet elevation on U.S. Forest Service land west of the Town limits. This indicates that the species may exist in Truckee.
<i>Ivesia sericoleuca</i> (Plumas ivesia)	At Airport Flat, this federal Candidate C2 species occurs in association with <i>Artemisia arbuscula</i> . Some of the plants occur in the mud flats (vernal pools).
<i>Lewisia longipetala</i> (long-petaled lewisia)	This federal Candidate C2 species occurs in boulder and rock fields in the subalpine coniferous forest and alpine zones in the Donner Pass area.
<i>Rorippa subumbellata</i> (Tahoe yellow cress)	This state endangered and federal Candidate C1 <sup>2</sup> species is only found along sandy beaches and the lake edge of Lake Tahoe. This plant has not been observed in Truckee in recent years, although it has historically occurred near Truckee, and may still exist.

<sup>1</sup> C2 - The threat and/or distribution data is insufficient to support federal listing at this time or insufficient data on file, but presumed extinct

<sup>2</sup> C1 - Sufficient data on file to support consideration for proposal to list as federal threatened or endangered



## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

**Table 2. Other Species of Concern  
Occurring in Truckee**

Species	Occurrence in Truckee
WILDLIFE	
<i>Accipiter cooperii</i> (Cooper's hawk)	This CDFG Species of Special Concern (SSC) nests in riparian vegetation in canyon bottoms and on river flood plains.
<i>Cypseloides niger</i> (black swift)	Between 1973 and 1984, five to ten individuals of this CDFG SSC were observed north of Truckee, and may be found in Truckee. These birds nest in small colonies on cliffs in foothill canyons.
<i>Dendroica petechia brewsteri</i> (yellow warbler)	This CDFG SSC nests in steep, rocky, montane chaparral habitat with scattered conifers. Individuals have been observed in Donner Memorial State Park.
<i>Martes pennanti pacifica</i> (Pacific fisher)	This member of the weasel family is a CDFG SSC. Fishers occur in mixed hardwood and coniferous habitat at mid elevations; however, individuals have not been detected in the Sierra Nevada during recent studies. There is the potential for their existence, given the appropriate habitat.
<i>Strix occidentalis occidentalis</i> (California spotted owl)	This U.S. Forest Service species of concern occurs in a variety of conifer and hardwood habitats throughout northern and parts of central and southern California. The owls usually nest in mature timber stands near open riparian or meadow areas.

## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

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**Table 3. Sensitive Natural Communities/Resources  
Occurring in Truckee**

Natural Communities/Resources	Occurrence in Truckee
FISH & WILDLIFE	
Lahontan cutthroat trout lakes and streams	Martis Creek provides habitat for the federal threatened Lahontan cutthroat trout. Virtually all cold water streams in the Lahontan Basin were formerly Lahontan cutthroat trout streams. Lakes and reservoirs within Truckee represent potential habitat for Lahontan cutthroat trout.
Loyalton-Truckee deer herd	The Loyalton-Truckee deer herd is an important biological resource. Highway crossings such as the Prosser Village and Fibreboard Undercrossings and foraging areas for this herd occur within Truckee. A fawning area has been identified northeast of Martis Creek Reservoir and may include area within the Town limits.
Riparian habitat/wetlands	Wetlands are important resources in Truckee. Types of wetlands of special concern that may occur in Truckee include vernal pools and fens. Riparian areas are corridors of vegetation adjacent to wetlands that result from the higher availability of groundwater. Riparian habitat is important for stabilizing the watershed and providing habitat to endemic riparian species.



## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

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### Traffic and Circulation Constraints

A number of intersections in Truckee currently operate at unacceptable levels at least some of the time. Of these, the Commercial Row/Bridge Street intersection, the Highway 267/West River Street intersection, the intersection of Highway 89 and West River Street, and Highway 89 south of Interstate 80, are not only currently congested, but capacity and/or functional improvements are constrained by physical conditions. Land use planning in these areas should either take into account the constrained and congested conditions or include plans for capacity and functional improvements including elimination of the existing constraints.

The Commercial Row/Bridge Street and the Highway 267/West River Street intersections currently operate at Level of Service (LOS) F. (Level of Service ratings run from A - best to F - worst.) The capacity of these intersections and of the roadways around them is constrained by close spacing between intersections, on-street parking, heavy pedestrian activity, tourist-related traffic (drivers unfamiliar with the area) and an at-grade crossing of the Southern Pacific Transportation Company (SPTC) mainline railroad tracks. Traffic in this area is expected to improve after construction of the planned Highway 267 bypass.

Highway 89 south of Interstate 80 is also congested at times, and the intersection of Highway 89 and West River Street operates at LOS F. The Interstate 80 on- and off-ramps at Highway 89 also currently operate at LOS F. Since Highway 89 serves as the main access from Interstate 80 to Squaw Valley and Alpine Meadows, and to Lake Tahoe, this route carries heavy traffic. Expansion of roadway capacity is constrained by the narrow undercrossing of the SPTC railroad tracks south of Deerfield Drive.

Interstate 80 presents a traffic constraint in that it creates a circulation barrier to north-south traffic. There are seven interchanges/crossings with Interstate 80 in the Town. The short distances between most of the interchanges will limit the possibility of additional interchanges in these areas. Given these constraints, priority for development should be given to areas served by existing interchanges with adequate capacity.

### Noise

Significant noise sources affecting large areas of Truckee are Interstate 80, State Routes 89 and 267, the Truckee Airport and the SPTC railroad line. Noise sources potentially affecting neighboring uses include the lumber yard, the Teichert Aggregate operation, other industrial activity and local roadways.

## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

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Existing noise contours have been mapped in the Noise Study prepared by The Planning Center and presented to the Town in early May, 1994. The 65 and 70 CNEL contours extend beyond the roadway rights-of-way in very few locations under current conditions. The most intrusive noise occurs in the vicinity of Interstate 80 and Highway 267, where the 65 CNEL contour ranges up to 275 feet and 83 feet from the centerline, respectively. Noise generated by vehicles on these roadways also occurs throughout the nighttime hours when nearby receptors are more sensitive.

Noise from Donner Pass Road and Glenshire Drive also currently exceeds 65 CNEL outside of the roadway right-of-way. Receptors adjacent to these roadways may be affected by noise levels exceeding generally acceptable standards, especially for residential uses or sensitive uses such as schools or hospitals. Noise could easily increase along Interstate 80, Highway 89, and Highway 267, given the available capacity on these roadways. Future 65 CNEL contours could extend 500 feet from Interstate 80 near the connection to Highway 89 (400 feet elsewhere) and 250 feet from Highway 89. Sensitive uses should be discouraged within these contours unless site-specific noise studies are undertaken, and needed noise mitigation incorporated into project design.

Noise constraints in specific areas of Truckee are discussed below.

### *Downtown Area*

Noise in the downtown area is influenced by train, plane, motor vehicle and industrial activity. Additionally, the lumber yard has the potential to generate noise in excess of 65 CNEL up to 400 feet away. These levels are compatible with commercial and industrial uses, but may be less acceptable for residential units, depending on their location. New residential uses in the downtown area should be limited to multi-family units or single family dwellings that are set back from the larger roadways. Noise levels would be acceptable for both commercial and industrial uses. The old mill site, located east of the lumber yard and north of the Truckee River, is subject to combined noise from the lumber yard activities, planes departing from the airport, and nearby train activity. Residential uses should be limited to interior locations where noise can be blocked by intervening buildings to reduce noise to 65 CNEL. Industrial uses are most compatible in proximity to the lumber yard, but commercial facilities are also acceptable beyond 200 feet. Noise on local roadways from trucks entering or leaving the lumber yard may create a nuisance to nearby commercial facilities.



## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

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### *Areas along the Truckee River*

Areas along the Truckee River would primarily be influenced by noise from the SPTC rail line. Airport noise would also contribute to the general noise level east of Downtown. The 65 CNEL contour from rail activity is currently located 240 feet from the tracks. Future levels will most likely be higher as train activity increases. Airport noise will most likely constitute a nuisance (from the sight and sound of overhead aircraft) rather than a constraint to development. Sensitive uses should be discouraged in areas where motor vehicle noise levels combine with train noise, such as the undercrossings with Interstate 80 and Highway 89. All other areas should be compatible with sensitive uses, as well as commercial and industrial facilities.

### *Areas along Highway 89*

The 65 CNEL contour currently is located within the right-of-way of Highway 89 along its entire length, with the 60 CNEL contour outside the right-of-way for that portion south of I-80 only. All land uses would be compatible within this noise environment, and current levels pose no constraint to development. Future noise levels could reach 65 CNEL at 125 to 250 feet from the right-of-way. Sensitive uses proposed within this distance would require a site specific analysis to ensure the noise levels are compatible, but there are no noise constraints foreseen for commercial or industrial uses along Highway 89.

### *Areas south of Interstate 80, West of Highway 89*

The predominant noise in this area emanates from vehicles on Interstate 80, although contributions from local roads, such as Donner Pass Road, may affect adjacent receptors. Noise levels in excess of 65 CNEL are currently within 275 feet of the Interstate 80 centerline, but could reach to within 500 feet based on the available roadway capacity. Residential and other sensitive uses should be discouraged within this zone. Commercial and industrial uses would be compatible adjacent to the Interstate 80 right-of-way, even with the potential future higher vehicle volumes that could be accommodated by the existing roadway capacity.

## **Air Quality**

Air pollutant levels monitored within the project vicinity exceed the state and/or federal standards for respirable particulates, PM<sub>10</sub>. During the winter months when inversions are low and residential wood burning often occurs, PM<sub>10</sub> levels increase to their highest levels. However, the Town recently adopted Ordinance 93-35 setting air quality standards for solid fuel burning appliances which should reduce

## TECHNICAL MEMORANDUM ON MAJOR CONSTRAINTS

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future standards exceedances.

Existing traffic activity on arterial roadways may result in localized carbon monoxide (CO) hot spots during worst case conditions. However, CO levels monitored over the last three years have not exceeded federal or state standards. Although these areas or periods of high pollutant levels are of concern, they are not expected to result in constraints to development within the Town.

**TOWN OF TRUCKEE  
GENERAL PLAN  
and  
ENVIRONMENTAL IMPACT REPORT**

**VOLUME II:  
Final Technical Appendix**

**Part 2 - Town of Truckee Technical Noise Study**





# Town of Truckee Technical Noise Study

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*Prepared for:*

The Town of Truckee  
12030 Donner Pass Road  
Truckee, California 96161

*Prepared by:*

The Planning Center  
2277 Fair Oaks Boulevard  
Suite 450  
Sacramento, California 95825



June, 1994





## NOISE FUNDAMENTALS

Sound intensity is measured in decibels (dBA) that are weighted to correct for the relative frequency response of the human ear. For example, an A-weighted noise level includes a de-emphasis on high frequencies of sound that are heard by a dog, but not by a human. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Unlike linear units (inches or pounds), decibels are measured on a logarithmic scale, representing points on a sharply rising curve.

Since noise is measured on a logarithmic scale, ten decibels is ten times more intense than one decibel, twenty decibels is one hundred times more intense and thirty decibels is a thousand times more intense. A sound as soft as human breathing is about 10 times greater than zero decibel. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). Various sound levels corresponding to typical sources are provided in Figure 1.

Many noise rating schemes have been developed for various time periods, but an appropriate rating of ambient noise affecting human communities also needs to account for the annoying effects of sound. The predominant rating scales for human communities are the Noise Equivalent Level (Leq), the Community Noise Equivalent Level (CNEL) and the Day-Night Average Sound Level (Ldn), all of which are based on A-weighted decibels (dBA). The Leq is the total sound energy of time-varying noise over a sample period. The CNEL is the time-varying noise over a twenty four hour period with a weighting factor applied to noises occurring during evening hours from 7:00 p.m. to 10:00 p.m. (relaxation hours) and at night from 10:00 p.m. to 7:00 a.m. (sleeping hours) of 5 and 10, respectively.

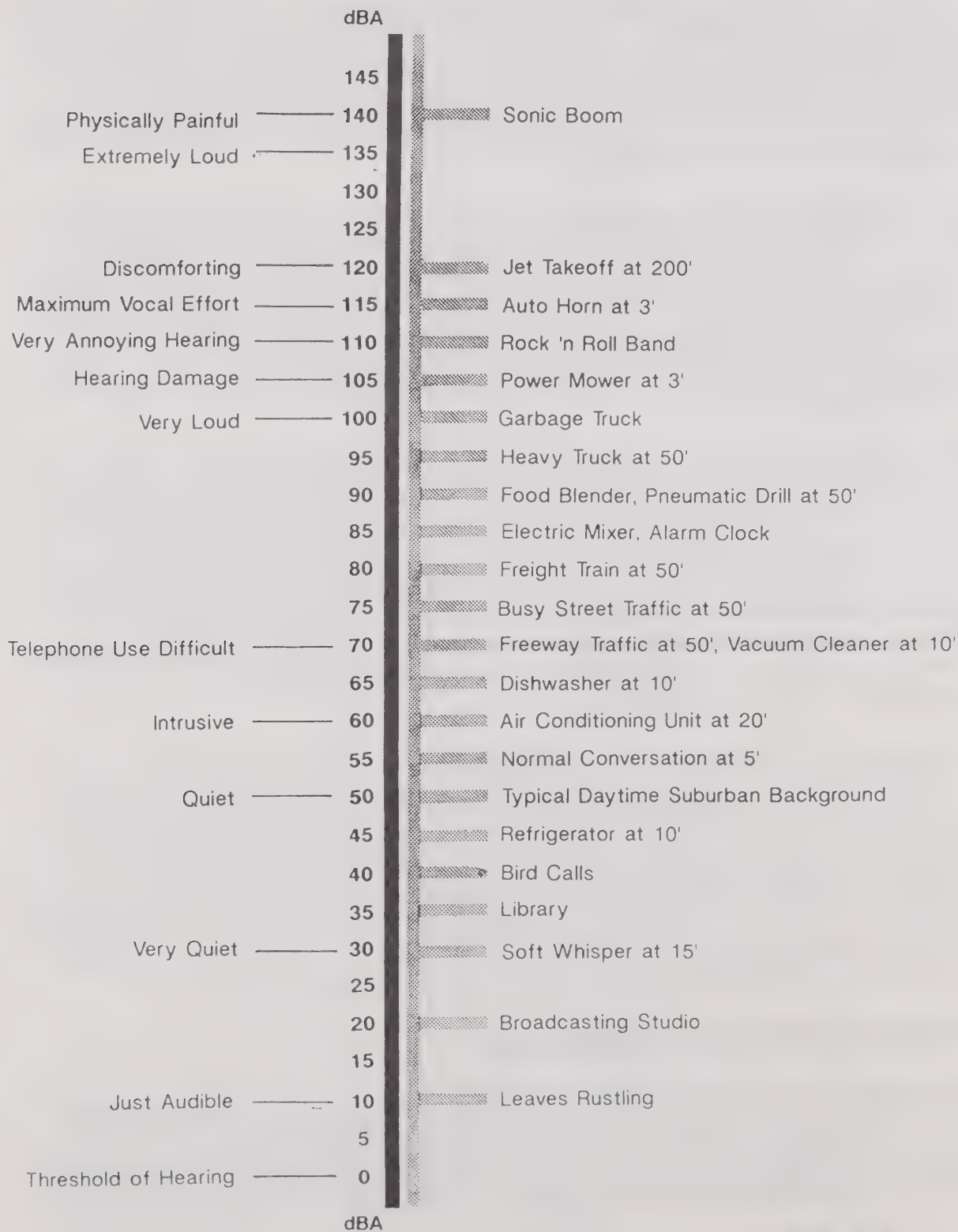
The Ldn measure is an average of the A-weighted sound levels experienced during a 24-hour period. Unlike the CNEL (which divides the 24-hour period into three periods), the Ldn divides the 24-hour period into only two periods. The Ldn identifies day (7:00 am to 10:00 pm) and night (10:00 pm to 7:00 am) periods, eliminating the evening hours from the period identified as more sensitive than the daytime. Since nighttime noise levels are considered more annoying, these measurements are increased by 10 dB before averaging along with the daytime levels. Although not as sensitive a measure as the CNEL, for most transportation noise sources the two measures (CNEL and Ldn) are essentially equal and may be used interchangeably.

### The Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to more than 85 decibels. Exposure to high noise levels effects our entire system, with prolonged noise exposure in excess of 75 decibels increasing body tension, affecting blood pressure, functions of the heart, and the nervous system. Extended periods of noise exposure above 90 dBA will result in permanent cell

# Sound Levels and Human Response

Figure 1



SOURCE: ADAPTED FROM WILLIAM BRONSON, "HEAR POLLUTION," CALIFORNIA HEALTH (OCTOBER 1971), P. 29

damage. A sound level of 190 dBA will rupture the ear drum and permanently damage the inner ear.

The ambient noise problem is widespread and generally more concentrated within urban areas or along larger roadways, than in outlying residential neighborhoods. According to Occupational Safety and Health Administration (OSHA) regulations shown in Table 1, protection against the effects of noise exposure shall be provided when the sound level exceeds the maximum exposure for various land use categories. A yearly average maximum of 45 dBA CNEL protects against indoor activity interference and hearing loss for residential, hospital, and educational land uses. Outdoor activity interference threshold levels are higher for these land uses, at 55 dBA CNEL. Commercial, transportation, industrial and recreation activities are considered highly variable, so thresholds for these land uses have not been determined. Hearing loss consideration for all activities becomes an issue at 70 dB or greater, for both interior and exterior noises.

**Table 1**  
**Yearly Average Equivalent Sound**  
**Identified to Protect the Public Health and Welfare**

	Measure	Indoor		To Protect Against Both Effects (b)	Outdoor		To Protect Against Both Effects (b)
		Activity Interference	Hearing Loss Consideration		Activity Interference	Hearing Loss Consideration	
Residential with Outside Space and Farm Residences	Ldn Leq(24)	45	70	45	55	70	55
Residential with No Outside Space	Ldn Leq(24)	45	70	45			
Commercial	Leq(24)	(a)	70	70(c)	(a)	70	70(c)
Inside Transportation	Leq(24)	(a)	70	(a)			
Industrial	Leq(24)(d)	(a)	70	70(c)	(a)	70	70(c)
Hospitals	Ldn Leq(24)	45	70	45	55	70	55
Educational	Ldn Leq(24)(d)	45	70	45	55	70	55
Recreational Areas	Leq(24)	(a)	70	70(c)	(a)	70	70(c)
Farm Land and General Unpopulated Land	Leq(24)				(a)	70	70(c)

Code:

- a. Since different types of activities appear to be associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity.
- b. Based on lowest level.
- c. Based only on hearing loss.
- d. An Leq(8) of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average, i.e., no greater than an Leq of 60 dB.

Note: Explanation of identified level for hearing loss: The exposure period which results in hearing loss at the identified level is a period of 40 years.

Source: California Occupational Safety and Health Administration



## **Sound Propagation and Attenuation**

Sound levels are generated from a source; thus, their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound level decays approximately six decibels for each doubling of distance from the source. If noise is produced by a line source, such as highway traffic or railroad operations, the sound will decrease three decibels for each doubling of distance in a hard site environment. Line source noise in a soft environment, which is relatively flat with vegetation, will decrease four and a half decibels for each doubling of distance.

Noise sources may either be a "line source" (e.g. a heavily traveled highway) or a "point source" (e.g. a stationary engine or compressor). Highway traffic noise on high volume roadways simulates a "line source" and the drop-off rate of sound with distance approaches "cylindrical spreading" wherein a nominal 3.0 dBA drop with each doubling of distance between the noise source and the noise receiver occurs. Thus, a noise level of 74.5 decibels at 50 feet from a highway centerline would attenuate to 70.0 decibels at 100 feet, 65.5 decibels at 200 feet, and so forth. It should be noted, however, that the nominal value of 3.0 dBA with doubling applies to sound propagation from a "line source": (1) over the top of a barrier greater than 3 meters in height, or (2) when there is a clear unobstructed view of the highway, the ground is hard, there are no intervening structures, and the height of the line-of-sight averages more than 3 meters above the ground.<sup>1</sup>

Environmental factors such as the wind direction and speed, temperature gradients, the characteristics of the ground (hard or soft) and the air (relative humidity), the presence of grass, shrubbery, and trees, often combine to increase the actual attenuation achieved outside laboratory conditions to 4.5 decibels per doubling of distance. This is particularly true where the view of the roadway is interrupted by isolated buildings, clumps of bushes or scattered trees, or the intervening ground is soft or covered with vegetation and the source or receiver is located more than 3 meters above the ground.

In an area which is relatively flat and free of barriers, the sound resulting from a single "point source" of noise spreads in a spherical manner away from the source and drops by 6 decibels for each doubling of distance. This applies to fixed noise sources and mobile noise sources which are temporarily stationary such as an idling truck or other heavy duty equipment operating within a confined area (such as lumber yard activities). Sound attenuation from a train resembles a line source near the railroad tracks and a point source at distances beyond three-tenths of the train length.

## **Motor Vehicle Noise**

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<sup>1</sup> Source: California Department of Transportation, "Noise Manual", 1980.

Noise levels adjacent to roadways vary with the volume of traffic, the mean vehicular speed, and the truck mix. It takes a 26 percent increase in the traffic volumes on a given route to increase the adjacent noise levels by 3.0 dBA. Variations in vehicle speed or truck mix have a more dramatic effect. Noise from motor vehicles is generated by engine vibrations, the interaction between the tires and the road, and the exhaust system. As vehicle speed increases, so does the noise from these areas of the vehicle. The noise level adjacent to a roadway is highly dependent on vehicle speed, especially at lower speed levels. The highest speeds and therefore highest noise levels are typically measured midlink, where traffic lights, stop signs and cross traffic provide less interference. Although some vehicles will go faster than the posted speed limit, in most areas, the average speed is generally just below this limit. The exception is found along long stretches of highway and roadways with a large amount of excess capacity.

The truck mix on a given roadway also has a significant effect on the adjacent noise levels. As the number of trucks increases and becomes a larger percentage of the total vehicle volume, the adjacent noise levels increase. A three percent truck mix has been identified on major roadways from past studies in urban environments.<sup>2</sup> This may increase up to thirteen percent on truck routes, especially in outlying areas. The effect of truck mix is more pronounced if the number of heavy duty (3+ axle) trucks is large when compared to the number of medium duty (2 axle) trucks.

## NOISE STANDARDS

Land use compatibility with noise is an important consideration in the planning and design process. Some land uses are more susceptible to noise intrusion than others, depending on the nature of activities expected with that use. For instance, at educational facilities it is important to concentrate and to communicate. An interior noise level in excess of 50 dBA may interfere with these activities. Similarly, interference with sleep may occur at 45 dBA, so residential land use standards must reflect this noise level.

Some land uses are more tolerant of noise than others. These uses typically include activities that generate loud noise levels or those that do not require verbal interaction, concentration, or sleep. Commercial and retail facilities require very little speech communications and therefore are generally allowed in noisier environments. Industrial areas can generate loud noises that would interfere more with communications than any exterior transportation-related noise.

The following discussions address the noise standards and those land uses deemed sensitive by state, regional and local jurisdictions. While most standards are considered guidelines, it is important to maintain reasonable ambient noise levels to protect the health and welfare of the community.

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<sup>2</sup> Orange County Environmental Management Agency.



## State of California

Land uses deemed noise sensitive by the State of California include schools, hospitals, rest homes, long-term care and mental care facilities. Many jurisdictions consider residential uses particularly noise sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some variability in standards for noise sensitivity may apply to different densities of residential development, and single family uses are frequently considered the most sensitive. Jurisdictions may identify other uses as noise sensitive such as churches, libraries, day care centers, hospitals, and parks.

Land uses that are relatively insensitive to noise include office, commercial, and retail developments. There is also a range of insensitive noise receptors which include uses which generate significant noise levels or uses where the level of human occupancy is typically low. Examples of insensitive uses include: industrial and manufacturing uses, utilities easements, agriculture, vacant land, parking lots, salvage yards, and transit terminals.

The noise standards identified are intended to provide guidelines for the development of municipal noise elements. Depending on the environment of a particular community, these basic guidelines may be tailored to reflect the existing noise and land use characteristics of that community. Table 3 provides the noise level corrections to customize the state guidelines for use in local jurisdictions. This allows maximum flexibility for cities and counties to develop community specific policies, while maintaining generally accepted standards.

Figure 2 is a land use compatibility chart for community noise which has been prepared by the California Office of Noise Control. It diagrammatically identifies "normally acceptable," "conditionally acceptable," "normally unacceptable" and "clearly unacceptable" noise levels for various land use types. As shown therein, multiple family residential land use is "normally acceptable" in exterior noise environments up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Single family residential areas are "normally acceptable" up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial and professional uses. Recreational uses, such as water recreation, are "normally acceptable" up to 75 CNEL and "normally unacceptable" from 70 to 80 CNEL.

A "conditionally acceptable" designation implies that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use type is made and needed noise insulation features are incorporated in the design. By comparison, a "normally acceptable" designation indicates that standard construction can occur with no special noise reduction requirements.

California's noise insulation standards were officially adopted by the California Commission of Housing and Community Development in 1974. In 1988, the Building Standards Commission approved revisions to these standards (Title 24, Part 2, California Code of Regulations). The ruling states that "Interior noise levels attributable to exterior sources shall not exceed 45 dB in

**Table 3**  
**Normalized Noise Level Corrections<sup>1</sup>**

Type of Correction	Description	Measured CNEL <sup>2</sup> Change (dBA)
<b>Seasonal Correction</b>	Summer (or year-round operation).	0
	Winter only (or windows always closed).	-5
<b>Correction for Outdoor Residual Noise Level</b>	Quiet suburban or rural community (remote from large cities and from industrial activity and trucking).	+10
	Quiet suburban or rural community (not located near industrial activity).	+5
	Urban residential community (not immediately adjacent to heavily traveled roads and industrial areas).	0
	Noisy urban residential community (near relatively busy roads or industrial areas).	-5
	Very noisy urban residential community.	-10
<b>Correction for Previous Exposure and Community Attitudes</b>	No prior experience with the intruding noise.	+5
	Community has had some previous exposure to noise but little effort is being made to control the noise. This correction may also be applied in a situation where the community has not been exposed to the noise previously, but the people are aware that bona fide efforts are being made to control the noise.	0
	Community has had considerable previous exposure to the intruding noise and the noise maker's relations with the community are good.	-5
	Community aware that operation causing noise is very necessary and it will not continue indefinitely. This correction can be applied for an operation of limited duration and under emergency circumstances.	-10
<b>Pure Tone or Impulse</b>	No pure tone or impulsive in character.	0
	Pure tone or impulsive character present.	-5

<sup>1</sup> Source: "Guidelines for the Preparation and Content of Noise Elements of the General Plan," California Office of Noise Control, February 1976.

<sup>2</sup> Corrections to be added to the measured, weighted 24-hour noise level.

any habitable room. The noise metric shall be either ... Ldn or ... CNEL, consistent with the noise element of the local general plan." Additionally, the commission specifies that residential structures to be located within exterior CNEL or Ldn contours of 60 dB or greater shall require an acoustical analysis showing that the building has been designed to limit intruding noise to an interior CNEL or Ldn of 45 dB.

Through enforcement of the California Administrative Code, the following additional standards for multiple family units must be met:

1. A sound transmission class (STC) rating of 50 (45 if field tested) for wall assemblies.<sup>3</sup>
2. An STC rating of 50 (45 if field tested) for floor-ceiling assemblies.
3. An STC rating of 26 for entrance doors (with perimeter seals) from interior corridors.
4. Ventilation, and cooling if necessary, to provide a habitable interior environment when the interior noise level standard is met by requiring windows to be unopenable or closed.

### **Nevada County**

The Nevada County General Plan includes a Noise Element (1988) which established the noise goals, policies and standards that new developments in Truckee complied with prior to incorporation. Part I of the Element includes a brief summary of existing and projected noise problems, goal and objectives based on this analysis, and implementing policies. Part II, the Noise Element Background Data Report, provides a detailed discussion of local noise problems summarized in Part I.

The goal of the Element is to provide for the health, safety, and welfare of the people of Nevada County through a set of policies designed to encourage an environment free of unnecessary and annoying noise. The standards identified in the Noise Element have been incorporated within the County Land Use and Development Code that have been adopted by reference into the Town of Truckee Municipal Code. Table 2 identifies the performance standards and land use compatibility standards which apply to all discretionary and ministerial projects excluding permitted residential land uses. Rural, residential and public land uses have the most stringent noise standards given the sensitive nature of these uses. Residential and public uses have exterior standards of 45 dBA during nighttime hours (10 p.m. to 7 a.m.), decreasing by 5 dba during the evening (7 p.m. to 10 p.m.) and a further 5 dBA during the daytime (7 a.m. to 7 p.m.). Rural standards are similar, with the exception of more stringent standards between 10 p.m. and 7 a.m. at 40 dBA. The other land use categories Commercial, Research and Development, and Industrial have lower standards since they are less affected by noisy environments. This is particularly true during night hours when many of these uses are closed down. The standards do not apply to those activities associated with the actual construction of a project.

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<sup>3</sup> An STC rating is applied to floor-ceiling and interior wall partition construction and represents the ability of the construction to isolate airborne noise.



**Table 2**  
**Nevada County Noise Element Standards**

Land Use Category	Zoning District	Time Period	Noise Level (dBA)
Rural	A1, TPZ, AE, OS, FR, 7 IDR	7 a.m. - 7 p.m. 7 p.m. - 10 p.m. 10 p.m. - 7 a.m.	55 Leq, Lmax 75 50 Leq, Lmax 65 40 Leq, Lmax 55
Residential	RA, R1, R2, & R3	7 a.m. - 7 p.m. 7 p.m. - 10 p.m. 10 p.m. - 7 a.m.	55 Leq, Lmax 75 50 Leq, Lmax 65 45 Leq, Lmax 60
Public	P	7 a.m. - 7 p.m. 7 p.m. - 10 p.m. 10 p.m. - 7 a.m.	55 Leq, Lmax 75 50 Leq, Lmax 65 45 Leq, Lmax 60
Commercial	C1, CH, C2 & OP	7 a.m. - 7 p.m. 7 p.m. - 10 p.m. 10 p.m. - 7 a.m.	70 Leq, Lmax 90 65 Leq, Lmax 75
Research & Development	R & D	7 a.m. - 7 p.m. 7 p.m. - 7 a.m.	65 Leq, Lmax 85 60 Leq, Lmax 70
Industrial	M1, M2	7 a.m. - 7 p.m. 7 p.m. - 10 p.m.	80 Leq, Lmax 90

## EXISTING NOISE ENVIRONMENT

### Ambient Noise Measurements

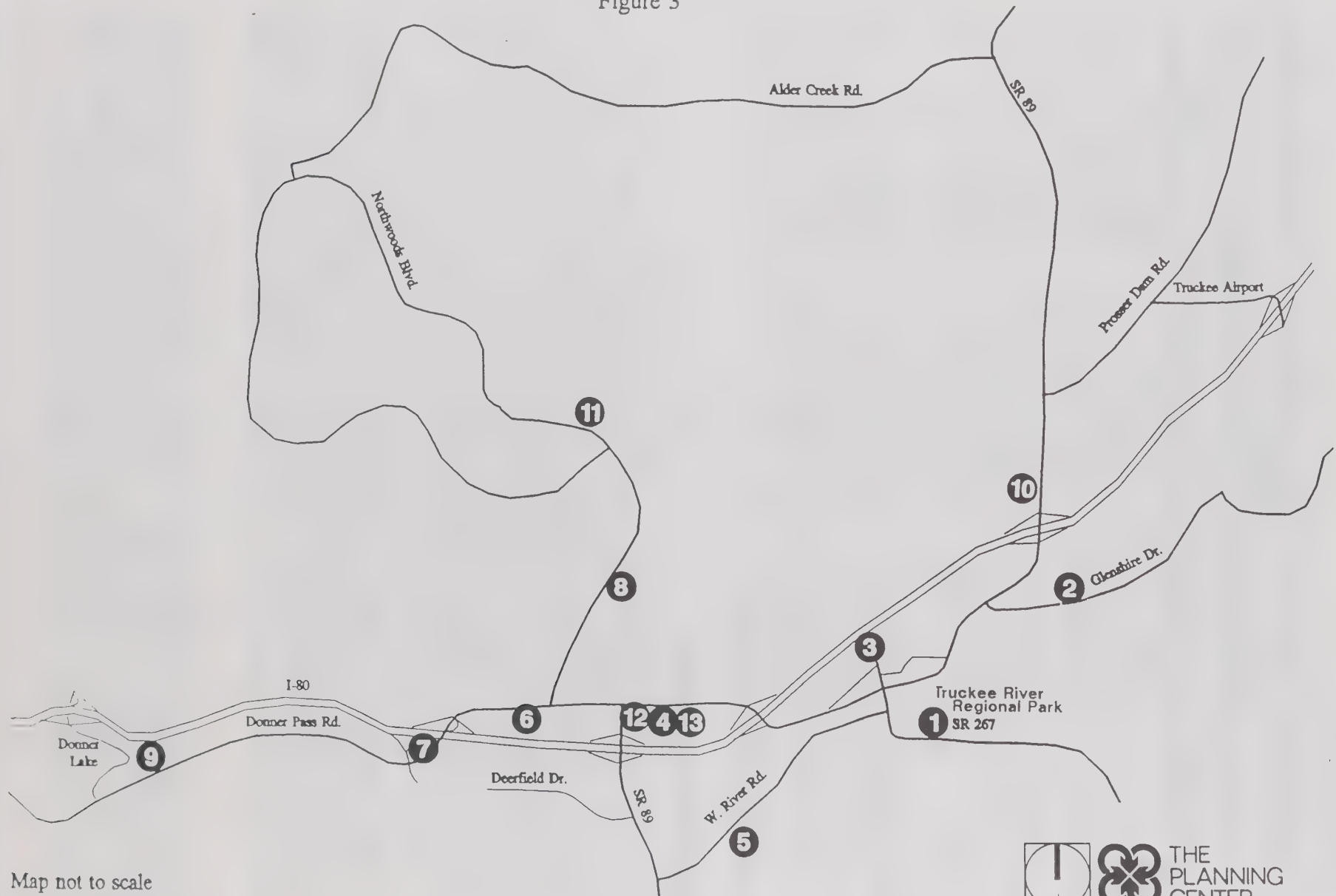
Noise measurements were taken by The Planning Center during a typical week day at eleven locations in the Town of Truckee. These locations are identified in Figure 3. Criteria for site selection included geographical distribution, land uses suspected of noisy activities, proximity to transportation facilities and sensitive receptor locations. The sites selected do not generally represent typical locations in the Town, but rather worst-case impact areas along roadways and near other noise sources. The main purpose of the noise monitoring was to determine an existing noise profile for the study area to estimate the level of current and future noise impact. The measurements can also be used to confirm or calibrate the noise modeling assumptions.

Measurements represent noise emanating from Interstate 80 (I-80), State Route 89 (SR-89), State Route 267 (SR-267), and the local roadway network. Sensitive receptor locations monitored include single and multi-family residential units, a school, a regional park, a motel, a children's center and a hospital. Noise levels were monitored during the peak traffic hour to represent maximum noise levels, or during off-peak conditions and then modified to reflect peak conditions.

The noise monitoring followed guidelines in the CALTRANS document Sound Procedures for Measuring Highway Noise (November 1981). All measurement locations had direct line-of-sight to free flowing traffic on the adjacent roadway. The transportation noise monitored in Leq during the peak hour or adjusted to reflect these conditions is typically within one dBA of the CNEL noise metric. Further noise measurement information is provided in the Appendix A.

# Noise Measurement Locations

Figure 3



Map not to scale

The Planning Center



The Town of Truckee includes residential, commercial, industrial and other supportive uses. Residential uses are scattered throughout the Town and make up the majority of the development within the Truckee. Commercial Row and Donner Pass Road are the locations of the majority of the commercial development.

The Town's industrial zone exists along East and West River Roads, which run parallel with Commercial Row and the Southern Pacific rail line.

Other uses within the Town are resort or recreation oriented, including hotels, ski resorts, golf courses, and a regional park (measurement location #1). The Southern Pacific Transportation Company railroad travels through the southern portion of the Town with one stop in the downtown on Commercial Row. The Tahoe-Truckee Airport is located in the southeastern portion of the Town. Table 4 provides noise measurement data and site descriptions for the eleven monitoring locations. Measured ambient noise levels ranged from 56.6 to 70.6 dBA Leq. Noise levels exceeded 65 dBA at four of the eleven monitoring locations. This 65 dBA level generally reflects the maximum limit for sensitive uses. Therefore, ambient noise measurements taken at these four worst-case locations indicate an incompatible noise environment for sensitive noise receptors.

**Table 4**  
**Ambient Noise Levels**

Location	Measured Leq	Adjusted Leq*	Day	Time	Land Use	Description
1	69.0	69.4	3/2 4	8:00 a.m.	Park	Baseball diamond at Truckee River Regional Park located on SR-267.
2	66.3	68.0	3/2 3	8:11 a.m.	SFD	Backyard of residence at 11634 Kahoe Court, adjacent to Glenshire Drive.
4	56.3	60.7	3/2 4	10:06 a.m.	Hosp	South/eastern corner of Tahoe Forest Hospital between I-80 and Donner Pass Road.
5	70.8	67.3	3/2 3	4:00 p.m.	SFD	Frontyard at residence at 10451 West River St.
6	58.6	61.2	3/2 3	4:25 p.m.	ES	Classrooms at northeastern corner of Truckee Elementary School on Donner Pass Road.
7	64.3	67.6	3/2 3	4:50 p.m.	Motel	Backside of Alpine Village Motel on Deerfield Dr. adjacent to I-80.
8	65.4	65.4	3/2 3	5:20 p.m.	SFD	Driveway of residence at 10375 Northwoods Blvd.
9	58.8	63.6	3/2 3	5:45 p.m.	MFD	Front garage of residence on Donner Pass Road.
10	52.3	56.6	3/2 4	8:32 a.m.	MFD	Coachland Recreational Vehicle Park on SR-89.
11	59.2	65.7	3/2 4	9:05 a.m.	MFD	Front yard of residence at 11445 Northwoods Blvd.
12	54.4	62.4	3/2 4	9:35 a.m.	CC	Backside of Tahoe Forest Hospital Children's Center adjacent to I-80.

\* Measured noise levels taken during off-peak traffic conditions are adjusted to represent noise levels during peak conditions.



Six of the monitoring locations were located at residential sites. The residential noise measurement locations consisted of single family and multi-family residences, and a trailer park. All were along major roadways, often fronting and at grade with the roadway. Numerous homes have front or back yards adjacent to the street. Due to the unique characteristics of the community, fences or walls are not common and were not associated with any of the measurement locations.

The residential locations represent a worst case site for the identified noise source. Measurement 2 is located at a residence along Glenshire Road approximately 10 feet above the roadway grade. Heavy duty vehicles have limited access to this roadway, however vehicle usage is high at this location since Glenshire Road provides the primary access to the neighborhoods in the eastern portion of Truckee. Other residences within the Olympic Heights community are expected to have similar or lower levels due to their proximity to the roadway. Measurement location 5, also at a residence, represents the highest noise level measured (70.8 dBA). This may result from its proximity to the roadway and the high level of nearby industrial vehicle activity. Other residences existing along West River Street are located at similar distances from the roadway centerline. Noise levels at these locations are expected to be comparable. Industrial uses also exist along West River Street. However, at the time the measurements were taken, industrial activities were limited due to weather conditions. Activity is highest during summertime, generating additional noise from increased industrial traffic and operations.

Measurement location 8 was located where the roadway is steeply inclined, therefore vehicles generated additional noise from increased acceleration. Noise measurement 9 was taken on Donner Pass Road near Donner Lake. Vehicle activity was limited at the time the measurement was taken. Adjacent land uses are primarily tourist related; noise levels during summer tourist activity are expected to be higher. Location 10 was taken at the Coachland Recreational Vehicle (RV) Park along SR-89. This location, like Prosser Lake Estates, is partially protected from vehicle noise by trees and topography. Measurements were attempted at a residence located in Prosser View Estates, however, the presence of barking dogs would have resulted in an inaccurate reading. The nearby RV Park was used as a measurement location and is expected to have similar noise levels and characteristics. Measurement 11 was taken at a multi-family unit along Northwoods Boulevard, in close proximity to the roadway. The residences in the Prosser Lake Estates on Northwoods Boulevard are expected to have similar or lower noise levels.

The noise level measured at the Tahoe Forest Hospital (Measurement 4), a single-story structure located between Donner Pass Road and I-80, was 60.7 dBA. The hospital measurement was taken in front of patient rooms at the southeast corner of the facility nearest to I-80. This was determined to be the worst-case location for noise exposure at the hospital. The main source of noise at this location was from I-80; additional noise was generated from the nearby delivery receiving location and another local roadway. The front portion of the hospital nearest to Donner Pass Road includes the Emergency Room, the lobby and patient rooms. Single-story buildings partially block the hospital from noise emanating from Donner Pass Road. Noise measurement 12 was taken at the Tahoe Forest Hospital Children's Center located directly southwest of the hospital. As with the hospital, the main noise source for the Children's Center was I-80.

However, lower noise levels are expected since intervening residences separated the Children's Center from the roadway noise.

The noise level measured at Truckee Elementary School (Measurement 6) was 61.2 dBA. This is considered an acceptable exterior environment for the playgrounds and classrooms of educational facilities. The measurement was taken in parking lots adjacent to a classroom in the northeastern corner. Noise levels in the school playground, which separates the classroom from the Donner Pass Road/Northwoods Boulevard intersection, are also expected to be compatible given the low levels measured at the classroom. Sierra Mountain Middle School exists east of the Elementary School on Donner Pass Road. Due to similar locations, noise levels are expected to be comparable.

Other noise sources found throughout the Town generate noise levels ranging from a leaf blower at 78 dBA (150 feet from the source) to a horn sounding at 42 dBA (75 feet from the source). In addition, noise levels can be expected from barking dogs at 65 dBA, a lawnmower at 71 dBA and home shop tools at 59 dBA. The Southern Pacific Transportation Company (SPTC) freight train was monitored at 81.6 dBA 30 feet away from the tracks.

### **Significant Noise Sources**

Two types of noise sources should be considered in a community noise inventory: fixed sources and mobile sources. Fixed sources include stationary noise generators such as airports, industrial and construction activities, air conditioning/refrigeration units, and home appliances. Mobile noise sources are typically transportation-related and include aircraft, trains, automobiles, trucks, buses, motorcycles, and off-road vehicles.

Although construction activities associated with public works projects or private development occur throughout Truckee, they are generally localized and temporary. Moreover, many fixed noise sources are typically accepted as part of the ambient or background noise level.

Motor vehicles in Truckee are the major source of continuous noise. Major roadways carry appreciable volumes of both truck and auto traffic. Land uses adjacent to these roadways are affected by motor vehicle noise.

Other transportation facilities in Truckee that contribute to community noise levels include freight and Amtrak passenger train activity along the Southern Pacific Transportation Company (SPTC) line, and aircraft accessing the Truckee-Tahoe Airport. The location of these transportation facilities in commercial areas or near residential developments, along with truck routes and the master planned circulation system, determines the level of noise impacts. Various categories of transportation noise generators are discussed separately in the following sections.

The Truckee-Tahoe Lumber Yard is also considered a potentially significant stationary noise source. The Lumber Yard is located in the downtown area where noise from mill operations could potentially affect nearby residences.

## Airport and Aircraft

The Truckee-Tahoe Airport is a general aviation airport primarily serving local personal and recreational air traffic. It is located off SR-267, south of the majority of development in Truckee. One-hundred and thirty-two aircraft are currently based at the airport which generate approximately 33,000 operations per year.<sup>4</sup> Over 87 percent are single engine aircraft, the remaining are twin engine aircraft and one helicopter.

Noise exposure maps were developed for the Truckee area by Brown-Buntin Associates in the 1988 Truckee-Tahoe Airport Master Plan, as shown in Figure 4. Currently, portions of the Ponderosa Golf Course are within the 55 dBA contour of the airport. At this level, noise generated by the airport is not a concern for this type of land use. All other land uses are too distant to be affected by noise generated at the airport, although sensitive uses throughout the Town would be subject to the sight and sound of aircraft accessing the airport.

The number of operations at the airport is expected to increase at a slow rate in the future, based on the increase of population and population's propensity to travel to an airport that serves a resort. Currently, there is no scheduled airline service to the airport. It is anticipated that airline services may commence with the expected growth to reach 199 aircraft or 83,000 annual operations in 2010.<sup>5</sup> Figure 5 depicts projected noise contours for the year 2010. As shown, projected future airport operations would generate noise levels at 55 dBA for part of the Town.

## Railroads

The Southern Pacific Transportation Company (SPTC) freight trains and Amtrak passenger trains travel east/west through the Town of Truckee. The train station is located downtown on Commercial Row. Adjacent industrial uses also have access to freight trains. Typical railroad operations include 6-8 freight trains and 2 passenger trains on the average day. On peak operation days, 18-20 freight trains can be expected. Freight trains run on an unscheduled basis, randomly distributed throughout the daytime and nighttime hours. The average freight train travelling through Truckee is 5,000 feet in length. Amtrak operations generally are scheduled in the midmorning and early afternoon and are 850 feet in length on average.<sup>6</sup> Table 5 identifies the operation distribution of train activity based on a hourly percentage (Day 7 a.m. - 7 p.m. Evening 7 p.m. - 10 p.m.; Night 10 p.m. - 7 a.m.).

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<sup>4</sup> Source: Truckee-Tahoe Airport Master Plan, 1988.

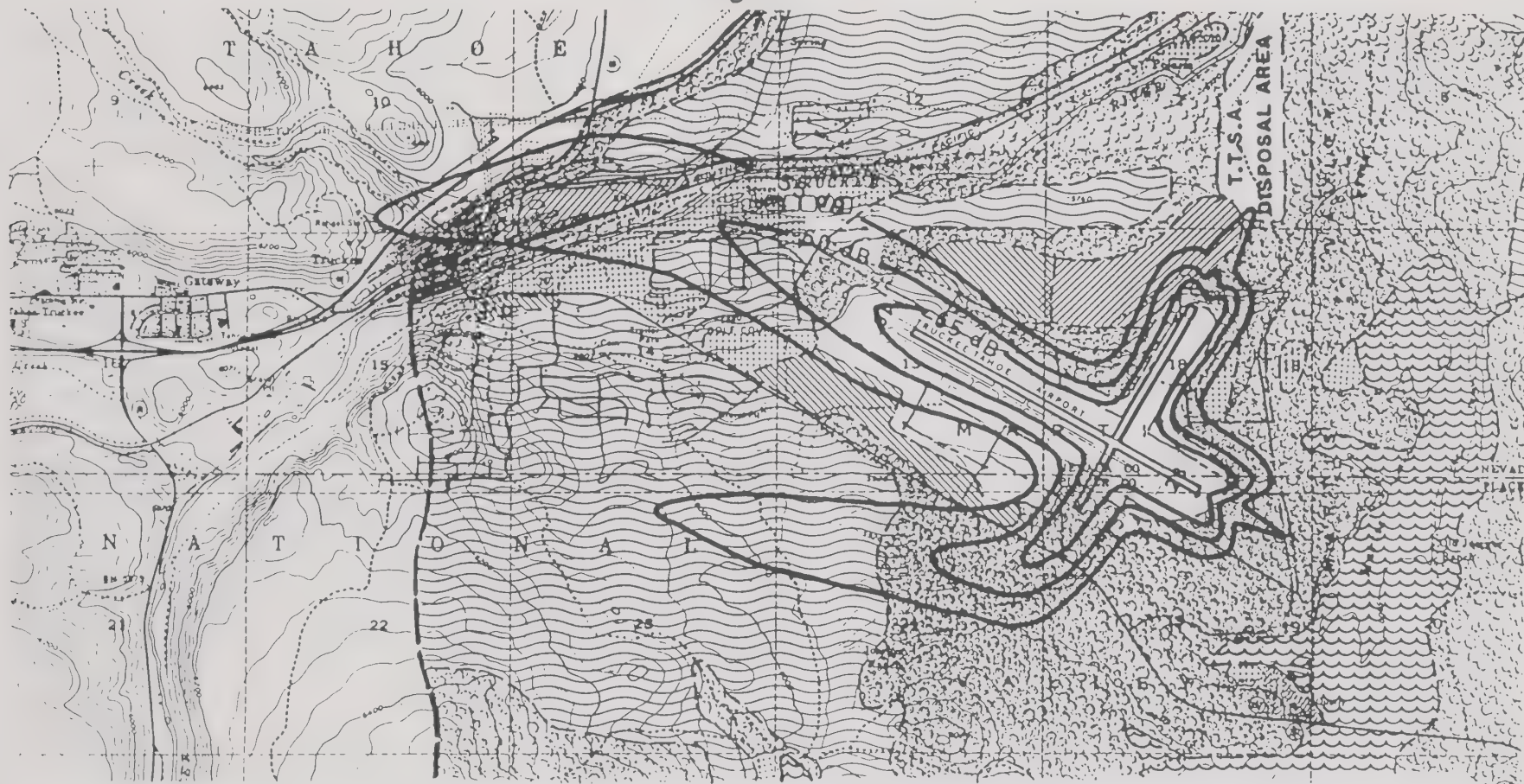
<sup>5</sup> Truckee-Tahoe Airport Master Plan, 1988.

<sup>6</sup> Dave Sorenson, Roseville office of the Southern Pacific Railroad, personal communication March 16 and 29, 1994.

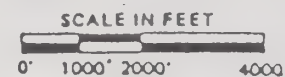


# 1988 Airport Contour Map

Figure 4



SOURCE: MARTIS VALLEY  
GENERAL PLAN

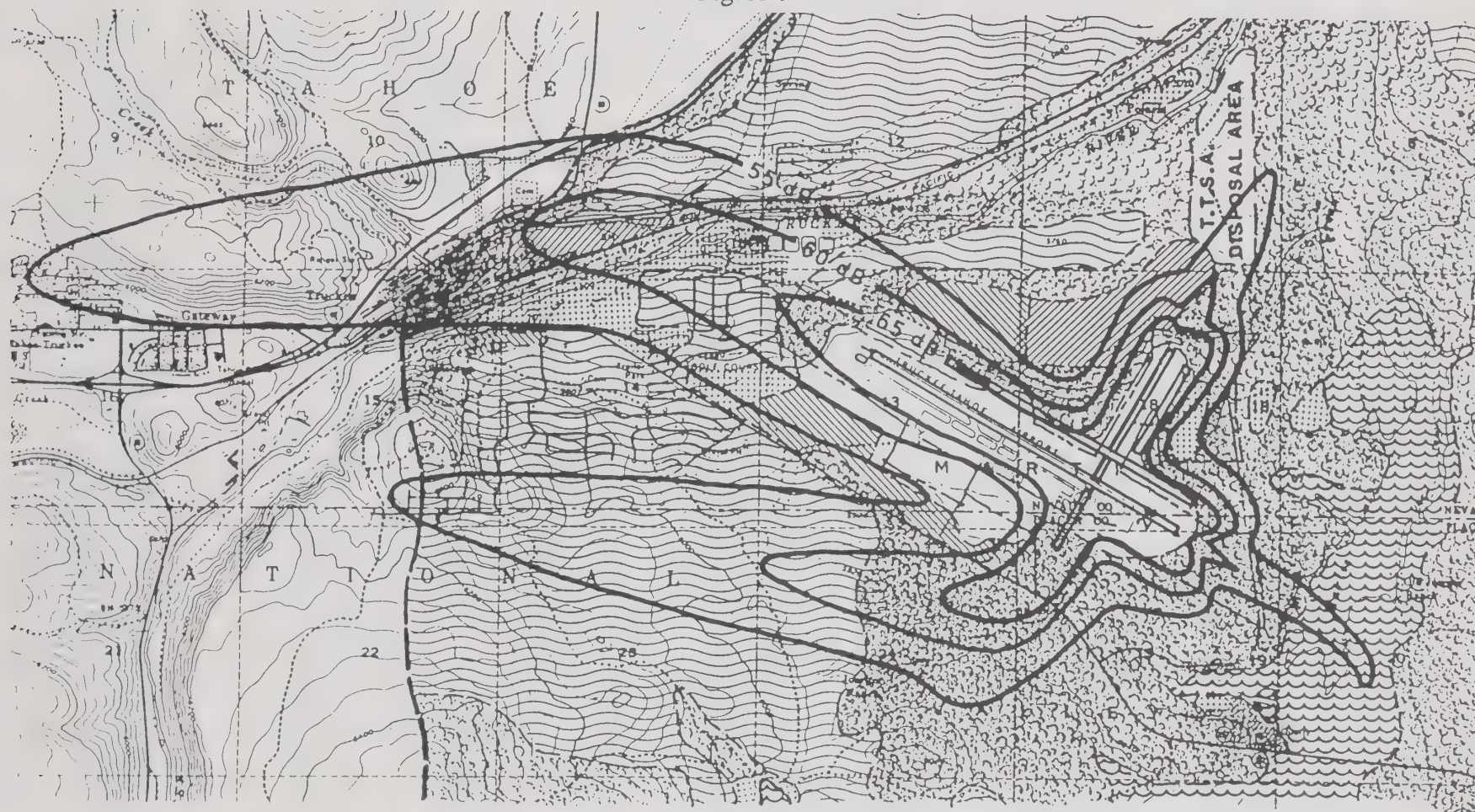




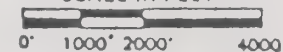


# 2010 Airport Contour Map

Figure 5



SOURCE: MARTIS VALLEY  
GENERAL PLAN  
SCALE IN FEET







**Table 5**  
**Railroad Operations Data**  
**Southern Pacific Transportation Company (SPTC)**

Railway Line (Location)	Number of Trains/Day	Train Length (feet)	Distribution Day/ Evening/Night	Speed
Freight	8	5,000	4%/1%/3%	40 mph
Amtrak	2	850	2%/0%/0%	40 mph

The data provided in Table 5 is interpreted with the Wyle Laboratories train noise methodology to determine noise associated with railway lines in Truckee. Noise exposure contours along railway tracks are determined from the number and type of trains using the line, the magnitude and duration of each train pass, and the time of the operation. The noise contours at 100, 200, 400 and 800 feet from each railway line are shown in Table 6 and depicted in the Existing Noise Contour Map.

As shown in Table 6, the combined train noise exceeds 65 CNEL at 100 feet from the track centerline. The lines may impact nearby sensitive receptors, especially along grades where train engines work harder and produce greater engine noise. The current level of activity on any of the lines is not expected to increase substantially in the future according to company representatives. However, rail traffic will respond to market demand and may increase or decrease depending on the future land uses and industrial activity along the line. Any future impact will be directly related not only to the number of operations occurring each day but also to the time of day when they occur. A significant increase in nighttime operations would have a detrimental effect on the quality of life in Truckee.

**Table 6**  
**Composite Railroad Noise Contours**

Railway Line	Noise Level (CNEL) at			
	100 feet	200 feet	400 feet	800 feet
SPTC Freight/Amtrack	70.6	66.6	60.8	55.1

Residential areas exist along the train routes throughout the Town. As shown on Table 6 and the Existing Map, Noise Contour, residences along railway lines may experience noise levels in excess of acceptable levels.

### Lumber Yards

The Truckee-Tahoe Lumber Yard has the potential to generate significant noise during operation of saws, planers, blowers, dry kilns and fork lifts. Noise measurement data taken at other similar lumber yard operations indicated that noise levels of approximately 65 dBA Leq could be expected at a

distance of 400 feet.<sup>7</sup> The Tahoe-Truckee Lumber Yard operates on a periodic basis, fluctuating with weather conditions and local lumber demand. Typically, the Lumber Yard begins normal operations in May and slows down when snow season begins.<sup>8</sup>

The Lumber Yard is located in the downtown area on Church Street. The surrounding area has a mix of industrial and residential uses. Residences are located along Church Street and on Trout Road, located north of the Lumber Yard. The nearest residence is located approximately 150 feet from the Lumber Yard property boundary. Noise at the nearest residence could exceed acceptable levels.

## Motor Vehicles

The highway traffic noise prediction model developed by the Federal Highway Administration (RD-77-108) was used to evaluate existing noise conditions in the study area. This model utilizes various parameters including the traffic volume, vehicle mix and speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening and nighttime hours. The resultant noise levels are then weighted and summed over 24 hourly periods to determine the CNEL value. Contours are derived through a series of computerized iterations to provide the 60, 65, and 70 dBA CNEL locations identified in Table 7. These contours are graphically depicted on the Existing Noise Contour Map. These contour locations can be used as a planning tool to ensure that new noise sensitive receptors are located away from major noise generators. They apply only to first line receptors, as receptors set back further from the noise source will benefit from the shielding provided by intervening land uses. The contours do not assume the presence of any sound walls or barriers.

The Existing Noise Contour Map depicts the current noise levels adjacent to roadways in the Town, assuming a standard sound attenuation of 4.5 dBA with each doubling of distance. As shown therein, the noise levels at 100 feet from the centerline of area roadways currently range from 45.7 to 71.6 dBA CNEL. As seen in Table 7, roadway noise levels in excess of 65 CNEL along I-80 and SR-89 could affect nearby sensitive noise receptors along the roadways. Sensitive receptors along these roadways are generally limited to residential uses.

<sup>7</sup> Nevada County General Plan, Volume 2: Background Data and Analysis, Section 3: Noise Analysis, 1988.

<sup>8</sup> Pete Griffin, Operations Manager, Truckee-Tahoe Lumber Mill, Co., personal communication March 24, 1994.



**TABLE 7**  
**EXISTING TRAFFIC AND NOISE CONDITIONS**

Distance to Contours (Ft.) <sup>3</sup>					
Roadway	ADT <sup>1</sup> (Veh./Day)	CNEL <sup>2</sup> @ 100 Feet	70 dBA	65 dBA	60 dBA
<b>SR 89</b>					
North of Alder Creek Road	1,650	57.3	R/W	R/W	R/W
Alder Creek Road to Prosser Dam Road	4,000	59.1	R/W	R/W	R/W
Prosser Dam Road to I-80	5,300	60.3	R/W	R/W	R/W
South of I-80 to Deerfield Drive	16,600	66.6	R/W	R/W	277
Deerfield Drive to West River Road	10,300	64.6	R/W	R/W	202
South of W. River Road	9,500	65.8	R/W	R/W	244
<b>I-80</b>					
West of Donner Lake Road	24,000	70.3	R/W	R/W	485
Donner Lake Road to Donner Pass Road	24,000	70.3	R/W	225	485
Donner Pass Road to SR 89	26,500	70.7	R/W	240	518
SR 89 to Commercial Row	23,500	71.6	R/W	275	593
Commercial Row to SR 267	23,500	71.6	R/W	275	593
East of SR 267	23,100	70.5	R/W	233	501
<b>SR 267</b>					
South of I-80 to Glenshire Drive	8,000	62.2	R/W	R/W	140
Glenshire Drive to Commercial Row	12,500	61.8	R/W	R/W	133
W. River Road to South River Street	9,300	60.6	23	51	109
W. of South River Street	8,600	62.5	32	68	146
South River Street to Estates Drive	7,300	63.8	38	83	178
<b>Northwoods Blvd.</b>					
North of Donner Pass Road	7,300	58.1	R/W	R/W	75
<b>Donner Pass Road</b>					
West of Donner Lake Road	2,800	54.0	R/W	R/W	40
Donner Lake Road to Cold Stream Road	7,000	58.0	R/W	34	73
Cold Stream Road to I-80	9,000	59.1	R/W	40	86
I-80 to Northwoods Blvd.	8,000	58.5	R/W	37	80
Northwoods Blvd to SR 89	13,000	60.7	R/W	51	110
SR 89 to Commercial Row	10,250	59.6	R/W	44	94
<b>W. River Road</b>					
SR 89 to River Park Place	2,500	53.5	R/W	R/W	37
River Park Place to SR 267	2,500	50.1	R/W	R/W	22
<b>Glenshire Drive</b>					
West of SR 267	5,400	59.5	R/W	43	93
West of Old Highway 40	1,500	51.3	R/W	R/W	26
<b>Prosser Dam Road</b>					
North of Truckee Airport	420	45.7	R/W	R/W	R/W
1. ADT = Average Daily Traffic volume. 2. CNEL = Community Noise Equivalent Level. Measured at 100 feet from roadway centerline. 3. Measured from roadway centerline. R/W means contour is located within the roadway right-of-way.					

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## Highways and Freeways

The Town of Truckee is affected by noise from Interstate 80 (I-80), State Route 89 (SR-89), and State Route 267 (SR-267). State highways typically carry high traffic volumes that operate at higher average speed levels than the majority of local roadways.

I-80 runs east/west through the center of the Town. With a daily traffic volume of 23,100 to 26,500 vehicles, the 65 dBA contour is located at 862 feet from the centerline of the roadway. Noise levels along I-80 could exceed acceptable levels for sensitive uses. Several residential areas are located along the roadway, however many are below the roadway grade or protected by topography or heavy vegetation. Residences which have a clear line of sight to the roadway and are not protected from roadway noise by vegetation, topography, or fences, are located west of Donner Pass Road and between SR-89 and Commercial Row. With daily traffic volumes ranging from 1,650 to 5,300 in Truckee, the SR-89 has a 65 dBA contour from 850 to 921 feet away from the centerline. Along the segments of SR-89 which exceed 65 dBA, no sensitive uses exist. However, the Donner Mobile Home Park, located at the corner of SR-89 and West River Road may experience levels nearby the standard. The SR-267 runs through the southeastern area of the Town, with a volume of 7,300 to 9,300 vehicles daily. The 65 dBA contour is located 748 feet away from the centerline.

## Truck Routes

Truck routes are identified to direct large trucks onto roadways constructed for that purpose. These routes are typically distant from sensitive receptor locations or noise levels have been appropriately mitigated to acceptable levels. Designated truck routes within the Town limits are I-80, SR-89, SR-267, and Alder Creek Road.

Traffic noise generation varies according to the number and types of trucks as a percentage of the total vehicles using the roadway on a daily basis. Medium-duty trucks are those with two axles and heavy-duty trucks are those with three or more axles. Since heavy-duty vehicles create much higher noise levels during a pass-by, the percentage of these trucks of the total truck mix is equally important.

Truck circulation is an important component of traffic flow in a Town's street network, and provision of adequate, well placed truck routes is essential to maintaining smooth traffic flow. Truck routes should be located such that truck travel on streets near residential areas is minimized while efficient transport of commodities throughout the Town is facilitated. Land uses in proximity to truck routes should also be planned accounting for long term noise generation. Uses should be compatible with the noise environment, after accounting for noise mitigation potential.

## APPENDIX A - NOISE MEASUREMENT DATA

### *I. Sound Level Meter*

The sound level meter utilized was a Model 700 Precision Sound Level Dosimeter and Analyzer manufactured by Larson & Davis Laboratories. This meter meets ANSI and IEC Standards (ANSI S1.4-1971 Type II precision).

### *II. Measurement Procedure*

One integrated noise measurement was taken at each of the locations illustrated on Figure 3. Twenty minute noise level recordings were used to represent the average ambient peak-hour noise level on-site.

### *III. Monitored Levels*

**TABLE A-1  
NOISE MEASUREMENT LEVELS**

Location	Day	Time	Leq	Lmax	Lmin	L10	L33	L50	L90
1	3/24/94	8:02 a.m.	69.0	94.0	50.0	70.5	68.0	66.0	58.0
2	3/23/94	8:11 a.m.	66.3	77.5	41.0	72.0	61.5	51.0	42.5
3	3/24/94	10:06 a.m.	56.3	71.0	47.5	59.0	55.5	53.5	50.5
4	3/23/94	4:00 p.m.	70.8	82.0	51.5	75.0	71.0	66.0	56.0
5	3/23/94	4:25 p.m.	58.6	66.5	47.0	61.5	58.5	57.0	52.5
6	3/23/94	4:50 p.m.	64.3	80.5	51.5	67.0	63.5	62.0	58.0
7	3/23/94	5:20 p.m.	65.4	77.5	46.0	69.5	65.0	62.0	52.5
8	3/23/94	5:45 p.m.	58.8	72.0	36.5	64.0	52.0	47.5	39.5
9	3/24/94	8:32 a.m.	52.3	69.0	33.5	53.0	49.0	46.5	37.0
10	3/24/94	9:05 a.m.	59.2	73.5	35.5	63.5	56.5	51.5	44.5
11	3/24/94	9:35 a.m.	54.4	67.5	42.5	56.5	53.5	52.5	48.0



## IV. Measurement Location Data

TABLE A-2 NOISE MEASUREMENT LOCATION DATA						
	Measurement Location	Leq	Traffic Volumes			Primary Noise Source
			Passenger Vehicles	Medium Duty Trucks	Heavy Duty Trucks	
1	Truckee River Regional Park	69.0	228	29	2	SR-267
2	Single Family Dwelling	66.3	104	5	3	Glenshire Drive
3	Tahoe Forest Hospital	56.3	205	21	43	I-80
4	Single Family Dwelling	70.8	156	14	2	West River Street
5	Truckee Elementary School	58.6	129	8	0	Donner Pass Road
6	Alpine Village Motel	64.3	327	14	73	I-80
7	Single Family Dwelling	65.4	168	12	0	Northwoods Blvd.
8	Multiple Family Dwelling	58.8	28	0	0	Donner Pass Road
9	Multiple Family Dwelling, Coachland RV Park	52.3	78	3	1	SR-89
10	Multiple Family Dwelling	59.2	80	5	0	Northwoods Blvd.
11	Tahoe Forest Hospital Children's Center	54.4	44	6	12	I-80

## APPENDIX B - FHWA RD-77-108 MODEL ANALYSIS ASSUMPTIONS

- I. Traffic volumes** -- were provided by Pacific Traffic and Transportation Engineers in March 1994.
- II. Road Grade Assumptions** -- level terrain and roadway.
- III. Roadway Widths Assumed** -- were provided by Pacific Traffic and Transportation Engineers in March, 1994. In addition, a field survey was conducted by The Planning Center staff. Geometrics are provided in Table B-1.
- IV. Temporal Distribution** -- Table B-1 provides the Temporal Traffic Distribution assumed (Percent) for the project area and utilized throughout this analysis for surface streets. This distribution was modified to account for higher truck percentages on Interstate 80, State Route 89 and State Route 267, as shown in Table B-3.

TABLE B-1 TEMPORAL TRAFFIC DISTRIBUTION (%)			
Type of Vehicle	Day	Evening	Night
Automobile	75.51	12.57	9.34
Medium Truck	1.56	6.09	0.19
Heavy Truck	0.64	0.02	0.08
Source: Orange County EMA representing 31 arterial intersections throughout the County and assumed to be typical of California arterials. Revised to reflect Truckee conditions: 2.58% total trucks with 71.31% medium duty trucks.			

Table B-2 Percentage of Truck Traffic			
Route	Total % Truck	Percentage Medium	Percentage Heavy
SR-89			
- West of SR-80	5.4	69.0	31.0
- East of SR-80	14.2	28.0	72.0
SR-80			
- South of SR-89	11.0	27.5	72.5
- North of SR-89	16.1	21.6	78.4
SR-267	4.0	34.1	65.9
- South of SR-80			
Source: USDOT and FHWA, Annual Average Daily Truck Traffic on the California State Highway System, 1989.			

- V. Speeds Assumed** -- for a "worst case" analysis, the posted speed limits were assumed for the noise modeling. Speeds noted during a field survey and future assumed speeds are included in Table B-3.
- VI. RD-77-108 Version** -- The Federal Highway Administration's RD-77-108 noise model was revised to determine Community Noise Equivalent Levels (CNEL) adjacent to roadways affected by project-related traffic.

TABLE B-3 TRAFFIC GEOMETRICS			
Roadway	Lanes	Presence of Median <sup>1</sup>	Posted Speed Limit
<b>SR 89</b>			
North of Alder Creek Road	2	U	55
Alder Creek Road to Prosser Dam Road	2	U	45
Prosser Dam Road to I-80	2	U	45
South of I-80 to Deerfield Drive	4	U	35
Deerfield Drive to W. River Road	4	U	35
South of W. River Road	2	U	45
<b>I-80</b>			
West of Donner Lake Road	4	D	55
Donner Lake Road to Donner Pass Road	4	D	55
Donner Pass Road to SR 89	4	D	55
SR 89 to Commercial Row	4	D	55
Commercial Row to SR 267	4	D	55
East of SR 267	4	D	55
<b>SR 267</b>			
South of I-80 to Glenshire Drive	2	U	45
Glenshire Drive to Commercial Row	2	U	35
W. River Road to South River Street	2	U	35
W. of South River Street	2	U	45
South River Street to Estates Drive	2	U	55
<b>Northwoods Blvd.</b>			
North of Donner Pass Road	2	U	35
<b>Donner Pass Road</b>			
West of Donner Lake Road	2	U	35
Donner Lake Road to Cold Stream Road	2	U	35
Cold Stream Road to I-80	2	U	35
I-80 to Northwoods Blvd.	2	U	35
Northwoods Blvd to SR 89	2	U	35
SR 89 to Commercial Row	2	U	35
<b>W. River Road</b>			
SR 89 to River Park Place	2	U	35
River Park Place to SR 267	2	U	25
<b>Glenshire Drive</b>			
West of SR 267	2	U	45
West of Old Highway 40	2	U	35
<b>Prosser Dam Road</b>			
North of Truckee Airport	2	U	35
<sup>1</sup> D = Divided; U = Undivided Source: Pacific Transportation Engineers, March 1994.			



**TOWN OF TRUCKEE  
GENERAL PLAN  
and  
ENVIRONMENTAL IMPACT REPORT**

**VOLUME II:  
Final Technical Appendix**

**Part 3 - Technical Analysis of the Draft General Plan**



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# *TRUCKEE GENERAL PLAN*

## Final Technical Analysis of the Draft General Plan Land Use Plan

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Prepared For:

Town of Truckee  
Community Development Department  
12030 Donner Pass Road  
Truckee, CA 96161

Prepared by:

The Planning Center  
2277 Fair Oaks Blvd., Suite 450  
Sacramento, CA 95825  
(916) 646-0325



December 28, 1995





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# *INTRODUCTION*

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This report is divided into sections corresponding to the issue areas analyzed. These sections include Land Use, Noise, Air Quality, Biological and Cultural Resources, Public Services, Hazards, Traffic and Circulation, and Fiscal Impacts.

The purpose of this report is to identify any potential environmental impacts or other major problems resulting from buildout of the Draft Land Use Plan so the land use plan can be adjusted and/or the General Plan policies can be formulated to address them.

This report provides the results of the technical analysis of the Draft General Plan Land Use Plan the Low Growth Alternative and the No Project Alternative, conducted by The Planning Center together with PacTrans and Stanley R. Hoffman Associates. This report describes the environmental impact analysis performed for the Draft Land Use Plan. This report will become part of the Technical Appendix of the General Plan.

The technical analysis identifies preliminary environmental, traffic, and fiscal impacts, policy implications, and circulation and service needs associated with the land uses designated in the Draft Land Use Plan, the Low Growth Alternative, and the No Project alternative. The No Project alternative consists of buildout of existing residential parcels. The Low Growth Alternative differs from the Draft Land Use Plan in that more areas are designated for resource conservation/open space, reducing total buildout.



# ***LAND USE***

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## **LAND USE**

### **Introduction**

This section identifies land use impacts that could result from the draft land use plan and alternatives.

### **Review Criteria**

Land use impacts could occur in the following areas:

- Land use compatibility
- Mineral resources and compatibility with mining
- Growth inducing impacts
- Visual Resources

### **Land Use Compatibility**

Land use incompatibility occurs when activities related to one land use negatively affect a different nearby land use. Such incompatibility may result from noise, odors, public access, traffic patterns, and lighting. Land uses that create potential compatibility problems include commercial, industrial, family support uses, schools, public facilities, ranching and timber harvesting, recreational uses, and mining, etc., in proximity to residential uses and sensitive wildlife habitat areas. Land use compatibility will be addressed in general plan policies and in implementation measures such as zoning, site development standards, and conditional use permit requirements.

Proposed land uses under the Draft Land Use Plan will vary dramatically from existing uses in some areas. Major new development areas are designated with the Planned Community designation at the Hopkins Trust and Teichert properties. The Planned Community areas are the



## ***LAND USE***

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most likely to result in incompatible land uses, as major new development will occur adjacent to undeveloped lands, State Park lands, and low density residential areas. The Planned Community designation recognizes this potential, and policies and design measures will be required to be included in the Specific Plans for these areas to eliminate potential land use incompatibilities. Similarly, changes in land use designations in the Downtown Study Area may result in land uses incompatible with existing uses. The Downtown Specific Plan will address these issues.

### **Mineral Resources**

Areas of significant aggregate resources within the Town boundaries will be preserved in the Resource Conservation/Open Space designation. Noise and truck traffic have resulted in some complaints about the existing mining operation near Juniper Flat from the existing residential area to the southeast. An area of 100 acres, including the existing Sha-Neva quarry are designated for Residential .5 units/acre. While eliminating mining in the area would eliminate noise and traffic concerns, this area is a significant mineral resource and should be protected as such. The General Plan should contain policies leading to regulations protecting adjacent residential areas from noise, dust, and truck traffic while allowing mineral resources extraction to continue.

The area of significant aggregate resources directly south of the Truckee River has existing access for trucks and is designated Public in recognition of the public entity land ownership in these areas. Privately owned mineral resources lands are designated RC/OS. Mineral resource extraction in this area may not be compatible with existing uses and with the Public land use designation. Policies should be included in the General Plan which address land use compatibility with adjacent mining activities, and development of mineral resource lands with uses that would preclude mining.

### **Cumulative Development**

Significant development is occurring and is planned to occur south of the Town in Placer County. Areas where development is planned to occur include the Martis Valley, Alpine Meadows, and Squaw Valley. Planned development could result in an additional 2,900 housing units, 218,000 square feet of commercial development, 5,000 square feet of industrial development, and 37,000 square feet of office development (Source: Placer County General Plan EIR, Volume 1, July 26, 1994). Nevada County's proposed land uses adjacent to the Town limits are subject to change since their General Plan process is still underway. Current designations accommodate 35 units

## ***LAND USE***

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in a PD designation west of Town (Negro Canyon area). Lands immediately to the north of Town are currently designated Forest, which has a maximum density of 160 acres per dwelling unit. Minimal residential development would occur in this area. The most significant amount of additional development could occur to the east of Town outside of Glenshire and the Meadows area. Approximately 800 acres is designated "Estate", which would allow 1 unit per 3 acres (approximately 260 units). Further south of this area in the Martis Valley is a 900 acre piece of land designated "PD" which would accommodate 180 units. In total approximately 500 additional dwelling units could be approved by Nevada County in proximity to the Town Limits.

The potential growth in jurisdictions adjacent to Truckee could result in potentially significant impacts in all environmental categories. The General Plan should include policies which address the need to coordinate with these jurisdictions to address such issues.

### **Alternatives**

The low growth alternative will result in slightly less development in the eastern portions of Town and in the Planned Communities 1 and 2, however the potential impacts to mineral resources and from land use compatibility will not be appreciably different from those of the Draft Land Use Plan. The No Project Alternative would not accommodate any substantial amount of additional development in or around the mineral resource areas, therefore impacts to mineral resources would be minimal.

## **GROWTH INDUCING IMPACTS**

### **Draft Land Use Plan**

The General Plan is intended to allow for growth projected to occur as a result of economic and market forces. The General Plan could result in additional induced growth beyond that planned for in the General Plan if it reduces barriers to growth in areas outside of the Planning Area or if it encourages growth beyond that projected and planned for in the General Plan.

The land use designations on the boundaries of the planning area can affect growth in the adjacent areas outside of the Town. The lands on the northern edge of the Town are designated Resources Conservation/Open Space and Resource Conservation/Open Space/National Forest. These designations provide a buffer between the developed and developing areas of Truckee and the

# *LAND USE*

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outlying areas to the north. This buffer will prevent growth in Truckee from inducing growth in the unincorporated areas to the North.

The existing and planned land uses on the southern boundary of the Town are similar to those existing and planned in the unincorporated areas to the south. Growth is occurring in these areas as a result of economic activity in the Tahoe basin and land use decisions by Placer and Nevada Counties. Development in Truckee under the General Plan will not induce growth in these areas.

Tahoe Donner and Donner Lake development are adjacent to Nevada County land on the western edge of the Town. The General Plan will not result in significant changes in these land uses, and therefore will not induce additional growth outside of the Town to the west.

The lands on the eastern edge of the Town are designated for residential development at densities ranging from .5 to 1 housing unit per acre (Tahoe Boca area). This designation may have the effect of inducing growth in the less densely developed unincorporated areas to the east. Major development proposals have been discussed for this area in the past, and development in the adjacent area of the Town may provide further incentive for the development in the unincorporated area.

Roadway capacity is a significant barrier to growth in the Truckee area. Highways 267 and 89 both experience traffic over capacity. CalTrans is expected to provide improvements to Highway 267, consisting of a bypass rerouting traffic around Downtown Truckee. The General Plan assumes construction of the Highway 267 Bypass, and includes policies requiring completion of the improvements prior to certain types of development in areas affected by it. Growth in Truckee that would be able to occur as a result of this improvement in roadway capacity is planned for as a part of the General Plan. It would not be additional induced growth.

## **Alternatives**

The growth inducing impacts of the No Project Alternative and the Low Growth Alternative will be less than of the Draft Land Use Plan because the area on the eastern edge of the Town that is designated for residential development as discussed above would not be developed under these alternatives. Under the Low Growth Alternative, the area would be designated for Resource Conservation/Open Space.



# *LAND USE*

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## **AFFORDABLE HOUSING**

### **Draft Land Use Plan**

The Draft Land Use Plan proposes a buildout under which employment in Truckee could exceed the number of non second-home dwelling units in Town. The high amount of employment relative to housing provided by the Draft Land Use Plan reflects two important goals of the Town in the General Plan process. The Town of Truckee has a strong desire to provide jobs and commercial services to residents, to reduce the need for commuting to the Tahoe Basin and to Reno, and the need for shopping trips to those areas. In addition, it was a goal of the Town to provide enough extra land designated for commercial and industrial uses to ensure that the price of commercial and industrial land could not be driven up by limited supply.

Housing in Truckee is in the higher price range for Nevada County, and jobs in the tourist industry often are low paying jobs. The combination of high housing prices, low wages, and an excess of jobs over housing (1.6 jobs per occupied housing unit) may result in a large in-commute from areas where affordable housing is available. To reduce this commute, affordable housing and employee housing where appropriate in tourist industry jobs should be provided.

### **Alternatives**

The Low Growth Alternative would result in a slightly lower jobs/housing ratio (1.5 jobs per occupied housing unit) than the Draft Land Use Plan. The potential for a large in-commute would be only slightly less than under the Draft Land Use Plan. The No Project Alternative would have a more balanced mix of jobs and housing than the other alternatives.

## **VISUAL IMPACTS**

Visual resources are of great importance in Truckee. Significant visual resources include prominent ridgelines, open vistas, and streams, rivers, and lakes.

### **Draft Land Use Plan**

Most prominent ridgelines would be within areas designated as RC/OS under the Draft Land Use Plan. This designation would largely protect these areas from development that would affect the

## *LAND USE*

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visual resource. A few areas of prominent ridgelines are designated for low density development. These areas are above Juniper Flat, above the Gateway area, and at the extreme southwest corner of the Town. Other areas of prominent ridgelines, in the area of the Armstrong Tract, south of the railroad tracks, on the west side of their intersection with Highway 89, and southeast of South River Street, are in areas designated for Residential Cluster uses. The Residential Cluster designation will require that new development be clustered away from slopes and other resource areas, including visual resources, and the resource should therefore be protected. The General Plan should include policies for these areas, as well as policies protecting the prominent ridgelines within areas designated for low density residential development.

Areas of significant open vistas include the area designated Public and RC/OS south of the Truckee River, Airport Flat and the surrounding area, and portions of the area designated as PC-2. The Airport Flat area is almost all designated as RC/OS, with a small portion designated as Residential Cluster. The General Plan should include policies to protect the visual resource in that area and in the PC-2 area. The RC/OS and Public designations should serve to protect the visual resource in the other areas.

Streams, rivers, and lakes are primarily located in already developed areas or in areas to be designated RC/OS. Specific policies protecting these resources for both their biological and visual resource value should be included in the General Plan.

### **Alternatives**

The No Project Alternative could allow some development in areas of significant visual resources where those areas are already subdivided and undeveloped. The Low Growth Alternative would reduce impacts on visual resources in the area above Juniper Flat, which would be designated for RC/OS instead of RC-10. Since streams, rivers, and lakes are primarily located in already developed areas or in areas to be designated RC/OS under the Draft Land Use Plan, impacts on these visual resources would be similar for all of the alternatives.

## **CUMULATIVE IMPACTS**

To the extent that loss of mineral resources is occurring in other parts of Nevada and Placer Counties, any loss in Truckee would contribute to cumulative impacts on mineral resources. Development in areas of visual resources would contribute to the cumulative effects on visual resources of development in Placer County and Nevada County outside of the Town boundaries.

# ***NOISE***

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## **Introduction**

This section addresses future noise generation and impacts.

## **Review Criteria**

Noise projections were done for Draft Land Use Plan and alternatives and projected noise levels were compared to the standard noise levels for various uses. The 70 Ldn contour was used as a measurement of noise impacts.

## **Future Noise Environment**

The major source of future noise in Truckee will be automobiles and trucks traveling on existing and proposed roadways through the Town. Other future sources of noise include overhead aircraft from the Truckee-Tahoe Airport, freight and passenger trains on the Southern Pacific line and lumber yard in the downtown area. In addition, construction noise will occur throughout the Town as a result of the land uses proposed with the General Plan.

## **Motor Vehicle Noise**

Noise levels on roadways in the Town were quantified for General Plan build-out using traffic conditions based on the trip generating characteristics of future land uses. The future 70 dBA, 65 dBA and 60 dBA noise contours are provided within the exterior noise exposure table for these conditions as shown in Table 1. General Plan build-out noise levels at 100 feet from the roadway centerline will range from 53.5 Ldn along Prosser Dam Road to a high of 69.8 Ldn along SR-89 and I-80. The 70 Ldn contour will be located within the right-of-way along 4 of the 33 links analyzed for buildout conditions of the Draft Land Use Plan.

The Low Growth and the No Project alternatives were also quantified for comparison purposes as shown in Tables 2 and 3. The Low Growth alternative generates consistently lower noise levels than the General Plan build-out scenario, with a correspondingly shorter distance to the 70 dBA, 65 dBA and 60 dBA contours. The No Project alternative provides even lower noise



# ***NOISE***

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generation and in several cases an actual decrease in noise levels. This decrease is generally due to changes in the vicinity of Donner Pass Road and the construction of the SR 267 Bypass that results in the shifting of traffic from existing roadways to take advantage of this new route.

Noise impacts can be broken down into three categories. The first is "audible" impacts, which refers to increases in noise level that are perceptible to humans. Audible increases in noise level refer to a change of 3.0 dBA or greater, since 3.0 dBA is the level that has been found to be barely perceptible in exterior environments. The second category, "potentially audible," references a change in noise level between 1.0 dBA and 3.0 dBA. This range of noise levels was found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1.0 dBA that are "inaudible" to the human ear. Only "audible" changes in noise level are considered significant.

Changes in noise level between the existing and the future General Plan build-out noise environments, as shown in Table 4, range from an increase of 0.8 dBA to 13.7 dBA. The increases associated with these roadways are primarily related to the amount of new development occurring in the area, the increase in regional traffic through the Town, and the current low traffic volumes on some roadways. An increase in excess of 3.0 dBA, considered "audible", is projected on the majority of the roadways in Truckee. Of the thirty-three links analyzed, twenty-eight would result in audible impacts to neighboring land uses, including uses nearby the three new roadways, SR 267 Bypass, Tahoe Donner Bypass and Downtown Road. Four of the links have "potentially audible" increases in noise levels, and one link would have an "inaudible" increase. The most severe increase (8.7 dBA) in noise level is associated with the West River Road connections to SR 89 at Highway 267 through the Downtown area. Second to this is increases up to 7.8 dBA along Prosser Dam Road, given the existing low traffic volumes and development in the northern section of the town.

## **Other Noise Sources**

Long-term noise generation from Truckee-Tahoe Airport, the Southern Pacific train line and existing mining and lumber yard operations have the potential to affect development proposed with the General Plan build-out. Projected noise contours for the Truckee-Tahoe Airport for the year 2010 are identified in the Technical Noise Study (April 1994). Train noise and sound generated by the lumber yard for existing conditions are provided in the Technical Noise Study. Changes in noise levels in the future would depend on changes in operations. Information is not available on future changes in operations of trains or at the lumber yard.

# ***NOISE***

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## **Construction Noise**

Short-term acoustic impacts are those associated with construction activities necessary to implement the land uses proposed in the General Plan. The noise levels will be higher than the ambient noise levels in the individual development areas but will subside once construction is completed. Two types of noise impacts should be considered during the construction phase. First, the transport of workers and equipment to the construction site will incrementally increase noise levels along site access roadways. The increase should not exceed 1.0 dBA when averaged over a 24-hour period, and should therefore be inaudible to adjacent noise receptors. The other impact is related to noise generated by the construction operations on-site.

Construction activities are carried out in discrete steps, each of which has its own mix of equipment, and consequently its own noise characteristics. These construction phases would change the character of the noise levels surrounding the construction site as work progresses. Noise from construction activities would typically range up to 96 dBA at 50 feet. This may constitute a significant noise impact on neighboring uses for the limited duration of these activities.

## **Cumulative Impacts**

The traffic projections include traffic in the future travelling through Truckee to and from other areas. The traffic noise analysis shown in the following tables therefore reflects General Plan buildout plus cumulative traffic.

## **Alternatives**

Tables 2 and 3 present noise levels under the Low Growth and No Project Alternatives. Table 4 compares noise projections for all three of the alternatives.

# NOISE

**TABLE 1  
NOISE PROJECTIONS: GENERAL PLAN BUILDOUT TRAFFIC CONDITIONS**

Distance to Contours (Ft.) <sup>3</sup>					
Roadway	ADT <sup>1</sup> (Veh./Day)	CNEL <sup>2</sup> @ 100 Feet	70 dBA	65 dBA	60 dBA
SR 89					
North of Prosser Dam Road	8,600	62.4	31	67	145
Prosser Dam Road to SR 267 Bypass	23,000	66.7	60	129	279
Donner Pass Road to I-80	16,600	62.9	34	72	156
I-80 to Deerfield Drive	22,000	67.9	72	155	335
Deerfield Drive to West River Road	18,600	67.1	64	139	299
South of West River Road	23,600	69.8	96	208	447
I-80					
West of Donner Lake Road	70,000	69.6	236	508	1094
Donner Lake Road to Donner Pass Road	70,000	69.6	236	508	1094
Donner Pass Road to SR 89	73,400	69.8	243	524	1129
SR 89 to SR 267	65,900	69.1	217	468	1008
East of SR 267	64,000	69.0	213	459	988
SR 267					
I-80 to Glenshire Drive	20,300	66.2	56	121	260
Glenshire Drive to Church Street	18,900	65.9	53	115	248
Church Street to Bridge Street	21,500	66.5	58	125	270
Bridge Street to West River Road	34,500	68.5	80	172	370
West River Road to SR 267 Bypass	35,500	68.6	81	175	377
South of SR 267 Bypass	35,000	68.6	80	173	373
SR 267 Bypass					
South of SR 89	21,300	66.4	58	124	268
North of SR 267	20,000	66.2	55	119	257
Northwoods Boulevard					
North of Donner Pass Road	14,000	61.0	25	54	116
Donner Pass Road					
West of Donner Lake Road	5,900	57.2	R/W	30	65
Donner Lake Road to Cold Stream Road	18,000	62.1	30	64	137
Cold Stream Road to I-80	22,500	63.0	34	74	159



# NOISE

**TABLE 1**  
**NOISE PROJECTIONS: GENERAL PLAN BUILDOUT TRAFFIC CONDITIONS**

Roadway	ADT <sup>1</sup> (Veh./Day)	CNEL <sup>2</sup> @ 100 Feet	Distance to Contours (Ft.) <sup>3</sup>		
			70 dBA	65 dBA	60 dBA
I-80 to Northwoods Boulevard	19,300	62.4	31	67	144
Northwoods Boulevard to SR 89	17,800	62.0	29	63	136
SR 89 to Commercial Row	12,400	60.4	23	50	107
<b>Commercial Row</b>					
East of I-80	17,200	61.9	R/W	62	133
West of Bridge Street	12,700	60.6	R/W	50	107
<b>West River Road</b>					
SR 89 to SR 267	18,700	62.2	30	65	141
<b>Glenshire Drive</b>					
East of SR 267	15,800	64.2	41	88	190
<b>Prosser Dam Road</b>					
East of SR 89	2,500	53.5	R/W	R/W	37
<b>Tahoe Donner Bypass</b>					
Northwoods Boulevard to SR 89	12,000	60.3	23	49	105
<b>Downtown Road</b>					
Bridge Street to Tahoe Donner Bypass	5,800	57.1	14	30	65
1. ADT = Average Daily Traffic volume. 2. CNEL = Community Noise Equivalent Level. Measured at 100 feet from roadway centerlines and 250 feet from I-80. 3. Measured from roadway centerline. R/W means contour is located within the roadway right-of-way.					

# NOISE

**TABLE 2**  
**NOISE PROJECTIONS: LOW GROWTH ALTERNATIVE TRAFFIC CONDITIONS**

Distance to Contours (Ft.) <sup>3</sup>					
Roadway	ADT <sup>1</sup> (Veh./Day)	CNEL <sup>2</sup> @ 100 Feet	70 dBA	65 dBA	60 dBA
SR 89					
North of Prosser Dam Road	8,100	62.1	30	64	139
Prosser Dam Road to SR 267 Bypass	15,800	65.0	47	101	217
Donner Pass Road to I-80	16,600	62.9	34	72	156
I-80 to Deerfield Drive	20,600	67.6	69	149	320
Deerfield Drive to West River Road	17,400	66.9	62	133	286
South of West River Road	22,300	69.5	93	200	431
I-80					
West of Donner Lake Road	63,000	69.2	220	473	1020
Donner Lake Road to Donner Pass Road	63,000	69.2	220	473	1020
Donner Pass Road to SR 89	69,000	69.6	233	503	1084
SR 89 to SR 267	61,000	68.7	206	444	957
East of SR 267	60,000	68.7	204	439	947
SR 267					
I-80 to Glenshire Drive	17,900	65.7	51	111	239
Glenshire Drive to Church Street	17,000	65.5	50	107	231
Church Street to Bridge Street	20,000	66.2	55	119	257
Bridge Street to West River Road	32,300	68.2	76	164	354
West River Road to SR 267 Bypass	33,400	68.4	78	168	362
South of SR 267 Bypass	32,800	68.3	77	166	358
SR 267 Bypass					
North of SR 267	19,100	66.0	54	116	249
South of I-80	17,000	65.5	50	107	231
Northwoods Boulevard					
North of Donner Pass Road	13,100	60.7	24	52	111
Donner Pass Road					
West of Donner Lake Road	6,600	57.7	R/W	33	70
Donner Lake Road to Cold Stream Road	17,000	61.8	28	61	132
Cold Stream Road to I-80	22,100	63.0	34	73	157

# NOISE

**TABLE 2**  
**NOISE PROJECTIONS: LOW GROWTH ALTERNATIVE TRAFFIC CONDITIONS**

Roadway	ADT <sup>1</sup> (Veh./Day)	CNEL <sup>2</sup> @ 100 Feet	Distance to Contours (Ft.) <sup>3</sup>		
			70 dBA	65 dBA	60 dBA
I-80 to Northwoods Boulevard	17,000	61.8	28	61	132
Northwoods Boulevard to SR 89	18,000	62.1	30	64	137
SR 89 to Commercial Row	11,700	60.2	22	48	103
<b>Commercial Row</b>					
East of SR 89	17,300	61.9	R/W	62	134
West of Bridge Street	12,700	60.6	R/W	50	109
<b>West River Road</b>					
SR 89 to SR 267	16,500	61.7	28	60	130
<b>Glenshire Drive</b>					
East of SR 267	14,100	63.7	38	82	176
<b>Prosser Dam Road</b>					
East of SR 89	2,200	52.9	R/W	R/W	34
<b>Tahoe Donner Bypass</b>					
Northwoods Boulevard to SR 89	7,500	58.3	16	36	77
<b>Downtown Road</b>					
Bridge Street to Tahoe Donner Bypass	5,000	56.5	13	27	58
1. ADT = Average Daily Traffic volume. 2. CNEL = Community Noise Equivalent Level. Measured at 100 feet from roadway centerlines and 250 feet from I-80. 3. Measured from roadway centerline. R/W means contour is located within the roadway right-of-way.					



# NOISE

**TABLE 3  
NOISE PROJECTIONS: NO PROJECT TRAFFIC CONDITIONS**

Distance to Contours (Ft.) <sup>3</sup>					
Roadway	ADT <sup>1</sup> (Veh./Day)	CNEL <sup>2</sup> @ 100 Feet	70 dBA	65 dBA	60 dBA
SR 89					
North of Prosser Dam Road	6,000	60.8	25	53	112
Prosser Dam Road to SR 267 Bypass	8,100	62.1	30	64	139
Donner Pass Road to I-80	13,100	61.9	29	62	133
I-80 to Deerfield Drive	17,700	66.9	62	134	289
Deerfield Drive to West River Road	11,500	65.1	47	101	217
South of West River Road	11,500	66.6	60	129	277
I-80					
West of Donner Lake Road	32,000	66.2	140	301	649
Donner Lake Road to Donner Pass Road	32,000	66.2	140	301	649
Donner Pass Road to SR 89	35,000	66.6	148	320	689
SR 89 to SR 267	31,000	65.8	131	283	609
East of SR 267	30,200	65.7	129	278	599
SR 267					
I-80 to Glenshire Drive	9,000	62.7	33	70	151
Glenshire Drive to Church Street	8,700	62.5	32	69	148
Church Street to Bridge Street	9,400	62.9	33	72	155
Bridge Street to West River Road	11,600	63.8	39	83	179
West River Road to SR 267 Bypass	9,600	63.0	34	73	158
South of SR 267 Bypass	11,200	63.6	38	81	175
SR 267 Bypass					
South of SR 89	6,700	61.4	27	58	124
North of SR 267	6,800	61.5	27	58	125
Northwoods Boulevard					
North of Donner Pass Road	11,400	60.1	22	47	101
Donner Pass Road					
West of Donner Lake Road	3,300	54.7	R.W	21	44
Donner Lake Road to Cold Stream Road	8,600	58.9	R.W	39	84
Cold Stream Road to I-80	8,800	59.0	R.W	40	85

# NOISE

**TABLE 3  
NOISE PROJECTIONS: NO PROJECT TRAFFIC CONDITIONS**

Roadway	ADT <sup>1</sup> (Veh./Day)	CNEL <sup>2</sup> @ 100 Feet	Distance to Contours (Ft.) <sup>3</sup>		
			70 dBA	65 dBA	60 dBA
I-80 to Northwoods Boulevard	7,800	58.4	R/W	36	79
Northwoods Boulevard to SR 89	14,100	61.0	25	54	117
SR 89 to Commercial Row	7,700	58.4	R/W	36	78
<b>Commercial Row</b>					
East of I-80	11,000	59.9	R/W	46	99
West of Bridge Street	10,000	59.5	R/W	43	93
<b>West River Road</b>					
SR 89 to SR 267	8,300	58.7	R/W	38	82
<b>Glenshire Drive</b>					
East of SR 267	7,800	61.1	26	55	119
<b>Prosser Dam Road</b>					
East of SR 89	800	48.5	R/W	R/W	R/W
<b>Tahoe Donner Bypass</b>					
Northwoods Boulevard to SR 89	NA	NA	NA	NA	NA
<b>Downtown Road</b>					
Bridge Street to Tahoe Donner Bypass	NA	NA	NA	NA	NA
1. ADT = Average Daily Traffic volume. 2. CNEL = Community Noise Equivalent Level. Measured at 100 feet from roadway centerline. 3. Measured from roadway centerline. R/W means contour is located within the roadway right-of-way. NA = Not Applicable; Roadway does not exist without the Project.					

**TABLE 4  
NOISE PROJECTIONS:  
COMPARISON OF ALTERNATIVES**

Increase in CNEL <sup>1</sup> @ 100 Feet			
	+ General Plan Buildout	+ Low Growth	No Project
<b>SR 89</b>			
North of Prosser Dam Road	3.3	3.0	1.7
Prosser Dam Road to SR 267 Bypass	6.4	4.7	1.8
Donner Pass Road to I-80	2.6	2.6	1.6
I-80 to Deerfield Drive	1.3	1.0	0.3
Deerfield Drive to West River Road	2.5	2.3	0.5
South of West River Road	4.0	3.7	0.8
<b>I-80</b>			
West of Donner Lake Road	5.3	4.8	1.9
Donner Lake Road to Donner Pass Road	5.3	4.8	1.9
Donner Pass Road to SR 89	5.1	4.8	1.9
SR 89 to SR 267	3.5	3.1	0.2
East of SR 267	4.4	4.1	1.2
<b>SR 267</b>			
I-80 to Glenshire Drive	4.0	3.5	0.5
Glenshire Drive to Church Street	4.1	3.7	0.7
Church Street to Bridge Street	5.9	5.6	2.3
Bridge Street to West River Road	6.0	5.9	1.3
West River Road to SR 267 Bypass	4.8	4.6	(0.8)
South of SR 267 Bypass	4.8	4.5	(0.2)
<b>Northwoods Boulevard</b>			
North of Donner Pass Road	2.9	2.6	2.0
<b>Donner Pass Road</b>			
West of Donner Lake Road	3.2	3.7	0.7
Donner Lake Road to Cold Stream Road	4.1	3.8	0.9
Cold Stream Road to I-80	3.9	3.9	(0.1)
I-80 to Northwoods Boulevard	3.9	3.3	(0.1)
Northwoods Boulevard to SR 89	1.3	1.4	0.3



# NOISE

**TABLE 4  
NOISE PROJECTIONS:  
COMPARISON OF ALTERNATIVES**

Increase in CNEL <sup>1</sup> @ 100 Feet			
	+ General Plan Buildout	+ Low Growth	No Project
SR 89 to Commercial Row	0.8	0.6	(1.2)
<b>West River Road</b>			
SR 89 to SR 267	8.7	8.2	5.2
<b>Glenshire Drive</b>			
East of SR 267	4.7	4.2	1.6
<b>Prosser Dam Road</b>			
East of SR 89	7.8	7.2	2.8
1. CNEL = Community Noise Equivalent Level. Measured at 100 feet from roadway centerlines and 250 feet from I-80.			



# *AIR QUALITY*

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## **Introduction**

This section presents projections of air quality impacts relating to buildout of the Draft Land Use Plan and alternatives.

## **Review Criteria**

Air emissions from traffic and construction were estimated for the Draft Land Use Plan and alternatives. Exceedance of standards was used as a measurement of impacts on air quality.

## **Construction-Related Impacts**

Temporary air quality impacts may occur during the site preparation and construction activities required to build the land uses proposed in the Draft Land Use Plan. Major sources of emissions would include construction equipment, off-highway vehicles, and fugitive dust from grading operations. In addition, emissions would occur at the power plant serving the construction-related electrical needs and exhaust emissions would be produced by motor vehicles transporting the construction crew, building materials and heavy duty vehicles to and from the construction sites.

Dust generated during construction activities has the greatest potential to result in a significant impact because the Town has had a number of exceedances of the standards for PM<sub>10</sub>. This impact would be short-term during the construction periods of individual projects and can be substantially reduced through watering or other dust control measures.

## **Regional Emissions**

Stationary sources include emissions at individual development site from the long term use of the land including natural gas combustion for heating requirements and cooking. Emissions will occur at the power plant supplying the electrical requirements of each project. Mobile source emissions result from vehicle trips generated from: commuting employees; residents and visitors accessing the new uses; commerce; and maintenance activities.

Particulate matter (PM<sub>10</sub>) has exceeded the state standard as measured at the Truckee air quality monitoring station. Since most violations occur in the winter months, this can generally be attributed to residential wood-burning and vehicles entraining dust along sand covered roadways.



## AIR QUALITY

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Emissions generated by wood-burning could be reduced by utilizing EPA Phase II certified wood burning stoves and fireplaces. The recently adopted Ordinance 93-35 setting air quality standards for solid fuel burning appliances may reduce future standards exceedance as newer stoves replace old stoves. Roadway dust can be minimized with clean-up programs and appropriate sand materials. Using methodology developed by the California Air Resources Board, the emissions associated with the Town of Truckee at build-out are anticipated to be 65,830 pounds of carbon monoxide, 6,299 pounds of reactive organic gases, 13,674 pounds of NO<sub>x</sub> and 7,108 pounds of particulate matter on a daily basis as shown in Table 5.

<b>Table 5</b> <b>General Plan Build-out Related Emissions</b> <b>(Lbs/Day)</b>			
<b>CO</b>	<b>ROG</b>	<b>NO<sub>x</sub></b>	<b>PM10</b>
65,830	6,299	13,674	7,108

### Alternatives

Carbon monoxide levels at primary locations in the Town during peak hour traffic were assessed with the California Department of Transportation Line Source Dispersion Model (CALINE4) computer model. Two scenarios were analyzed for this project to reflect traffic volumes related to the No Project Alternative and those associated with General Plan build-out. As shown in Table 6, the carbon monoxide concentrations adjacent to the intersections most affected by General Plan build-out would be below the one-hour and eight-hour state and federal standards with or without the development proposed. The Low Growth Alternative would generate even lower carbon monoxide levels at build-out. The maximum carbon monoxide concentration expected with the addition of background levels could reach 6.5 ppm over the 1-hour averaging period and 4.5 ppm over the 8-hour averaging period at 50 feet from the intersection of SR-267 and the 267 Bypass. This is a less than significant impact of the project.

### Cumulative Impacts

The traffic projections included traffic in the future traveling through Truckee to and from other areas. The air quality analysis for traffic impacts therefore reflects General Plan buildout plus cumulative traffic.

**Table 6**  
**Intersection Carbon Monoxide Concentrations**  
**(Year 2014)**

Receptor Distances <sup>2</sup>	1-Hour Average (ppm)		8-Hour Average (ppm) <sup>1</sup>	
	100 feet	200 feet	100 feet	200 feet
<b>NO PROJECT (EXISTING CONDITIONS WITH BUILD-OUT)</b>				
<b>SR-80 EB Ramp/Cold Stream @</b> - Donner Pass Road	1.2	1.0	0.8	0.7
<b>SR-89 @</b> - West River	1.6	1.2	1.1	0.8
<b>SR-267 @</b> - SR-267 By Pass	1.3	1.0	0.9	0.7
<b>GENERAL PLAN BUILD-OUT</b>				
<b>SR-80 EB Ramp/Cold Stream @</b> - Donner Pass Road	3.1	2.5	2.2	1.8
<b>SR-89 @</b> - West River	3.0	2.3	2.1	1.6
<b>SR-267 @</b> - SR-267 By Pass	3.5	2.7	2.5	1.9
Background Concentration <sup>3</sup>	3.0	3.0	2.0	2.0
<b>State Standard</b>	20.0	20.0	9.0	9.0
<b>Federal Standard</b>	35.0	35.0	9.0	9.0
<sup>1</sup> Based on an 8-hour persistence factor of 0.7. <sup>2</sup> Receptor distances are measured from intersection centerline. <sup>3</sup> Background concentration provided by Steve Brisby, ARB, personal communication 2/23/95.				



# **BIOLOGICAL AND CULTURAL RESOURCES**

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## **BIOLOGICAL RESOURCES**

### **Introduction**

This section addresses potential impacts to biological resources. Sensitive biological resources reported to occur in the Town of Truckee and the immediate vicinity include federal and state listed plants and wildlife species, candidates for federal listing, California Department of Fish and Game (CDFG) Species of Special Concern, United States Forest Service (USFS) species of concern, wetlands, and riparian areas. In addition, the Loyalton-Truckee deer herd is a resource of interest to CDFG as well as to area residents and planning agencies (Pencovic and Brown 1990).

The Town contains known habitat or potential habitat for a number of listed and candidate plant and wildlife species. These species include Plumas ivesia (*Ivesia sericoleuca*), Tahoe yellow cress (*Rorippa subumbellata*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), Cooper's hawk (*Accipiter cooperii*), Northern goshawk (*Accipiter gentilis*), yellow warbler (*Dendroica petechia brewsteri*), California spotted owl (*Strix occidentalis occidentalis*), Sierra red fox (*Vulpes vulpes necator*), and wolverine (*Gulo gulo*) (CDFG 1994; Benson *et al.* 1990; Butler 1989; HB&A 1993).

Species not currently classified as listed or candidates for listing, but that are of concern to wildlife management agencies include the mule deer (*Odocoileus hemionus*) and pine marten (*Martes americana*), among others. Truckee barberry (*Mahonia sonnei*), a plant species known to occur in the Town, was recently de-listed because of a change in taxonomy.

Two minor deer migration routes reportedly extend across the Town (Pencovic and Brown 1990), culminating in the Prosser Village and Fibreboard Undercrossings. A major deer migration route extends into Section 3 along the eastern boundary of the Town. A critical deer fawning area is located south of Union Valley on USFS land, outside the Town's southern boundary.

Wetland and riparian habitat occur in the Town in association with natural springs, streams, and lakes such as Donner Lake, Prosser Reservoir, Truckee River, Gregory Creek, Martis Creek, Alder Creek, Cold Creek, Station Creek, and Trout Creek. One of these, Martis Creek, supports the only reported population of the federal threatened Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) (McEwan *et al.* 1986) in the Town.



# ***BIOLOGICAL AND CULTURAL RESOURCES***

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## **Review Criteria**

Potential impacts on the following resources were assessed:

- plants and wildlife species including species of concern and federal candidate species
- wetlands and riparian areas
- deer migration routes

Impacts could include:

- permanent loss of habitat
- direct mortalities/injuries of sensitive species
- loss of forage or prey species
- habitat fragmentation and obstruction of movement corridors
- increased interspecific and intraspecific competition for resources
- harassment by humans, pets, or livestock
- increased noise and lighting
- increasing traffic resulting in more vehicle strikes
- increased erosion and sedimentation
- habitat degradation due to increased human usage

## **Draft Land Use Plan**

Buildout of the Draft Land Use Plan would result in the following impacts:

- Loss of plant and wildlife habitat in the Town due to additional residential,

## *BIOLOGICAL AND CULTURAL RESOURCES*

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commercial, and industrial developments within the Town boundaries

- The potential disruption of deer migration via the Prosser Village and Fibreboard Undercrossing routes due to additional residential development and open space recreational development to the north and to the south of these undercrossings. Both of these migration corridors are in areas designated as Open Space Recreation/Development Reserve Overlay
- The potential disruption of the major deer migration route extending into Section 3 on the east edge of the Town due to additional residential cluster development east of Glenshire Drive
- Proportionately higher deer and other wildlife mortalities from increased vehicle impacts and predation by pets (roaming dogs and cats) as a result of significant human population increase in the Town
- The potential loss or disruption of wetland/riparian natural habitats resulting from planned community/residential developments immediately adjacent to Cold Creek, Station Creek, Trout Creek, and the stream flowing north into Prosser Reservoir west of Station Creek, and in the area designated for high density residential use located on the south side of Highway 267
- The possible loss or degradation of Plumas ivesia (a Category 2 candidate species for federal endangered species listing) populations located in seasonal wetland areas affected by build-out adjacent to the airport, in the vicinity of Glenshire Drive, in the area just west of the agricultural inspection station north of I-80, and along Alder creek running from Tahoe-Donner northeast into Prosser Reservoir
- Potential degradation of approximately 80 acres of potential pine marten habitat west of Donner Lake due to additional residential development to the north and south of Donner Creek
- Loss of potential Northern goshawk habitat in a 5-mile radius around Prosser Reservoir due to additional residential, residential cluster, planned community, residential high density, and industrial development.

Focused biological surveys for sensitive habitats should be conducted as part of General Plan implementation and specific project review.

# ***BIOLOGICAL AND CULTURAL RESOURCES***

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## **No Project Alternative**

Because the No Project Alternative would not result in urban development on significant areas of currently undeveloped land, impacts to biological resources would be less than under the Draft Land Use Plan. Some significant impacts could occur as a result of buildout of existing subdivided but undeveloped lots. Extensive areas of intact plant and wildlife, riparian, and wetland habitats are present on lands zoned for residential, commercial, industrial, and agricultural/rural residential land uses. As currently allowable development of these parcels continues, impacts to these habitats, as well as mortality of individual organisms could occur.

## **Low Growth Alternative**

The Low Growth Alternative could result in significant impacts to listed plants and wildlife species, species of concern and federal candidate species, wetlands, and riparian areas. Impacts would be similar to those described above for the Draft Land Use Plan, but would be proportionately less because additional acreage of plant and wildlife habitat would remain in Resource Conservation/Open Space. Impacts to deer migration corridors would not occur.

## **Mitigation**

In general, significant impacts to biological resources that may result from the Draft Land Use Plan or Low Growth Alternative can be mitigated to less than significant. The best option is to avoid sensitive organisms and habitats during project development. Other options for mitigation include transplanting sensitive plants (Example: Plumas ivesia) to suitable habitat off-site or creation of compensation habitat via reclamation of disturbed areas. Capture and relocation of wildlife is not recommended because survival rates of relocated animals are usually low and introduction of relocated wildlife may cause displacement of existing wildlife resident in the relocation area. If sensitive wildlife/habitat avoidance is not possible, habitat compensation/set aside is the only effective means of mitigating impacts to a less than significant level.



# ***BIOLOGICAL AND CULTURAL RESOURCES***

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## **CULTURAL RESOURCES**

### **Introduction**

The Town of Truckee is one of the richest locations in California in terms of the density and variety of recorded cultural resources. Virtually all of the Town is considered moderately to extremely sensitive in terms of cultural resources (Russo 1994). Moderately sensitive areas tend to be associated with hill slopes. Areas that are flatter, but away from water sources tend to be of high cultural sensitivity. Many areas along the Town's waterways, especially flatter areas, are of extreme cultural sensitivity.

Recorded/designated resources within the Town include approximately 115 archaeological sites (26 historic sites, 79 prehistoric sites, 10 historic-prehistoric sites), 160 historic structures, two National Register Properties, 6 properties determined eligible for National Register listing, one California Historical Landmark, and one California Point of Historic Interest (Russo 1994; HB&A 1991). Donner Memorial State Park and Museum, located on the east edge of Donner Lake, are dedicated to preserving historic sites and the pioneer heritage associated with the Overland Emigrant Trail and the Donner Party tragedy. Historic structures of Truckee are preserved and incorporated into modern Town life in the historic district in downtown Truckee.

The locations of many of these resources, in particular, prehistoric archaeological sites from the Martis and other cultures, are considered confidential. These locations are only released by the state clearinghouse to qualified archaeologists on a need to know basis.

Some of these resources are quite concentrated, such as structures in the historic district. Others are more isolated such as certain prehistoric archaeological sites whose locations are confidential. Still others are linear sites passing completely through the Town, such as the Overland Emigrant Trail, the first Transcontinental Railroad, and the world's first long-distance telephone line route (see Meschery 1978).

Only between eight and 20 percent of the Town has been comprehensively inventoried for cultural resources. This means that the numbers, types, and locations of cultural resources in 80 to 92 percent of the Town area have not been adequately identified. Therefore, most areas to be developed as the General Plan builds out will require inventories on a project by project basis if not previously inventoried.

### **Draft Land Use Plan**



## ***BIOLOGICAL AND CULTURAL RESOURCES***

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The Draft Land Use Plan will result in potentially significant impacts to historic and prehistoric resources. Resources affected could include any of the recorded resources described above, as well as hundreds that most likely exist but are not yet discovered and/or recorded. Prehistoric archaeological sites appear to be the resource type most likely to be affected. As a part of General Plan implementation and specific project review, inventories should be completed, and potential impacts from this alternative assessed by qualified individuals.

Impacts will likely be reduced/mitigated by project avoidance, site capping, structural stabilization/renovation, project re-design, and data recovery. The General Plan should contain policies to assure proper cultural resource identification and mitigation of potential impacts to recorded and unrecorded resources within the Town during build-out.

### **No Project Alternative**

Additional impacts to cultural resources within the Town are not anticipated to result under the No Project Alternative, with the exception of potential impacts from new construction allowable under current zoning and renovation/remodeling of historic structures. Unrecorded archaeological sites could be exposed during construction activities, especially in areas near water sources and areas of historical activity.

### **Low Growth Alternative**

The Low Growth Alternative would probably result in significant impacts to historic and prehistoric resources. Prehistoric archaeological sites appear to be the resource type most likely to be affected by this alternative. Some of these potential impacts would probably be characterized as significant. Low Growth Alternative impacts would be proportionately fewer than Draft General Plan impacts because additional acres would remain in Resource Conservation/Open Space.

# ***PUBLIC SERVICES***

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## **Introduction**

Coordination of public services with growth in Truckee will require that the Town work closely with the special districts that provide services. Sewage collection services are provided by the Truckee Sanitary District (TSD); sewage treatment service is provided by the Tahoe-Truckee Sanitation District (TTSA); water treatment and service is provided by the Truckee-Donner Public Utility District (PUD) and by the Glenshire and Donner Lake private water purveyors; fire protection services are provided by the Truckee Fire Protection District; and recreation services and parks are provided by the Truckee-Donner Recreation and Park District. All of the special districts plan for the provision of service to their district based on their own projections of future growth. All of the districts include areas outside of Truckee. In some of the districts, such as the school district and the sewer district, Truckee accounts for only a small portion of the district's service area. None of the districts have planned as far in the future as the time period of the General Plan.

## **Review Criteria**

Demand at buildout for schools, parks, sewer and water was analyzed based on generation rates used by the district providing the service. An assessment of future available service capacity was attempted, but, since the service districts do not plan for as long a period as the General Plan, the results of the assessment are of limited use.

## **Draft Land Use Plan and Alternatives**

Table 7 shows sewage generation at buildout for each of the alternatives. Peak flows at buildout would exceed planned capacity. However, buildout is assumed to be beyond the year 2014, while the planned expansion to 10 mgd is planned for 2005. Total capacity to serve increased population will probably be available. Careful coordination will be necessary to ensure that service is available as development occurs.

Table 8 shows projected school demand. One addition middle school or one additional elementary school (K-6) will be required at buildout. This is reflected in the Draft Land Use Plan.

Table 9 shows projected parkland demand. There is currently a shortage of parkland in Truckee. The General Plan does not show any new parks, although it does show significant new open space areas. The Town and the Park District should work together to identify areas to be acquired for new parks. The Town should establish a General Plan policy requiring dedication of parklands as a condition of all types of development.

# PUBLIC SERVICES

**TABLE 7**

Estimated Sewage Generation at Buildout <sup>1</sup>			
	Alternatives		
	Draft Land Use Plan	Low Growth Alternative	No Project
<b>Weekdays</b>	22,500 Population 2.23 MGD	21,840 Population 2.16 MGD	16,059 Population 1.59 MGD
<b>Weekends</b>	47,570 Population 4.71 MGD	46,100 Population 4.56 MGD	30,420 Population 3.01 MGD
<b>31% of the Capacity of the Planned 2005 Treatment Plant Expansion<sup>2</sup> to 10 MGD<sup>3</sup></b>	<b>3.1 MGD</b>	<b>3.1 MGD</b>	<b>3.1 MGD</b>

<sup>1</sup> TTSA Generation Rate 99 Gal/Person/Day

<sup>2</sup> Truckee currently accounts for 31% of flows.

<sup>3</sup> Million Gallons per Day

**TABLE 8**

Estimated Demand for Schools at Buildout <sup>1</sup>			
	Draft Land Use Plan	Low Growth Alternative	No Project
<b>Students<sup>1</sup></b>			
K - 5	1,136	1,106	786
6 - 8	436	424	302
9 - 12	359	349	253
<b>Schools<sup>3</sup></b>			
K - 5	1.9	1.8	1.3
6 - 8	.6	.6	.4
9 - 12	.4	.4	.3

Existing four schools are one with grades K-3, 627 capacity; one with grades K-3 62 capacity, one with grades 4-6, and one with grades 1 7-12.

<sup>1</sup> Generation rates and school sizes from; developer fee, justification study/capital improvement plan - Tahoe Truckee Unified School District, March 1994

<sup>2</sup> MF K-5: .04 6-8: .015 9-12: .013  
SF K-5: .159 6-8: .061 9-12: .05

## PUBLIC SERVICES

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<sup>3</sup> K-5 600 Students/School, 6-8 750 Students/School, 9-12 900 Students/School

**TABLE 9**

**Estimated Parkland Demand at Buildout**

	<b>Acres/1000 Population Requirement</b>	<b>Draft Land Use Plan</b>	<b>Low Growth Alternative</b>	<b>No Project</b>	<b>Under District Ownership as of 1990</b>
Neighborhood Park	2.5	56.25	54.6	40.14	3.6
District Park	2.5	56.25	54.6	40.14	21.2
Regional Park	5.0	112.50	109.20	80.30	63.6
Open Space	20	410.00	436.00	321.18	-0-

Sources: Truckee - Donner Recreation and Park District Ten Year Master Plan 1990 - 2000

The Truckee Donner Public Utility District (PUD) Master Plan plans for a year 2010 Truckee population of 20,300. General plan projected population for the year 2015 is 17,250 full time residents, with the potential for double that population when second home residents are included. The General Plan should include policies phasing provision of necessary services with development approvals .





# ***HAZARDS***

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## **Introduction**

This section addresses hazards relating to flooding, geology and slope, fire, avalanche and air traffic.

## **Review Criteria**

The Draft land Use Plan and alternatives were reviewed for impacts related to flooding, geologic hazards, fire hazard, snow avalanche hazard, aircraft hazard, and water quality. The extent to which each alternative would expose additional people to hazards was assessed.

## **FLOODING HAZARDS**

### **Draft Land Use Plan**

The Federal Emergency Management Agency (FEMA) has identified areas subject to flooding in the event of a 100-year flood. These areas are located around Donner Lake, along the banks of the Truckee River and along Coldstream Creek. In several areas along the Truckee River, more extensive flooding than a 100-year flood storm event could occur, and could flood areas up to 300 feet from the banks of the Truckee River.

Flooding is a constraint around Donner Lake and along the Truckee River, and to a lesser degree along Coldstream Creek. The Draft Land Use Plan provides for public lands, resource conservation/open space, commercial, and residential (1-2 du/ac and 3-4 du/ac) around Donner Lake. In general, the residential uses are outside of the 100-year flood zone. It is not anticipated that new flooding impacts would occur as a result of the Draft Land Use Plan, since the area around Donner Lake has already been developed. Currently, the Town's development code requires

The Truckee area is subject to the Lahontan Regional Water Quality Control Board's prohibition on fill within 100 year floodplains and wetland areas. Exceptions to this prohibition may be granted for public roadway projects. Because of this prohibition there is currently adequate protection from fill in wetland areas. The General Plan should include policies supporting the Lahontan prohibition.

Implementation of the Draft Land Use Plan would result in grading and construction activities that

## ***HAZARDS***

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would expose soils to erosion from water. Increased development would increase the amount of stormwater runoff resulting in an increased demand for stormwater drainage systems.

### **Alternatives**

Flooding hazards would be similar for the alternatives and the Draft Land Use Plan.

## **TOPOGRAPHY AND GEOLOGIC HAZARDS**

Some portions of Truckee contain areas of very steep slopes. Generally, areas over 30 percent slope are considered to be very steep, and therefore, too steep for development. Areas with slopes 30 percent or greater include the areas along the Truckee River, the ridges and hillsides north and west of Downtown, the ridges north of Gateway and north and west of Donner Lake, and areas on and around Alder Hill.

In the western portion of the Town, some development around Donner Lake has occurred in areas with slopes 30 percent or greater. In the eastern portion of the Town, particularly along the Truckee River development is limited. The Draft Land Use Plan proposes development in the steep slopes areas in the western portion of the Town. Residential densities include 0.5 du/ac, 1-2 du/ac, 3-4 du/ac, RC-5 (residential cluster, average density 1 du/5 ac), and RC-10 (residential cluster, average density 1 du/10 ac). New development in areas with steep slopes should be subject to all policies, programs and development criteria established by the Town. In addition, site-specific geologic and engineering studies should be required as a part of development approval.

Geologic hazards in the Truckee area consist of earthquakes and landslides. The Boca/Truckee and Dog Valley Faults are located near Truckee, and a number of small fault traces have been identified within the Town limits. None of these faults have been designated as Alquist-Priolo Special Study Zones, which is a designation used by the State of California to identify significant hazard zones along faults.

The identified faults, along with the potential for damage from earthquakes in the Truckee area, have been studied by the State. The Department of Mines and Geology has conducted general geologic studies of the region, while the State Board of Reclamation, which operates dams in the area, has studied the faults in the Truckee area in more detail. The conclusions of the studies are that the potential for strong groundshaking from faults in the area is not considered great, and that

## ***HAZARDS***

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the potential for damage is also not high. The potential for seiche, flooding in areas surrounding lakes as a result of earthshaking, was also studied and found to be minimal.

Figure A identifies epicenters and faults in Nevada County, including the Truckee Region.

### **Draft Land Use Plan**

Buildout of the Draft Land Use Plan could expose more people to the effects of geological hazards with the potential to impact Truckee, including groundshaking, seismically induced surface rupture, and slope instability leading to mudslides and landslides. The overall level of risk associated with these hazards in Truckee is considered to be minimal.

The General Plan should include policies and programs to 1) establish requirements for site specific geologic and soils studies and 2) use the most current professional standards in building design and standards for governing the location of facilities.

### **Alternatives**

While the risk from geologic hazards under the Draft Land Use Plan was considered to be minimal, it would be even less under the alternatives do to the lower growth capacity.

## **FIRE HAZARDS**

### **Draft Land Use Plan**

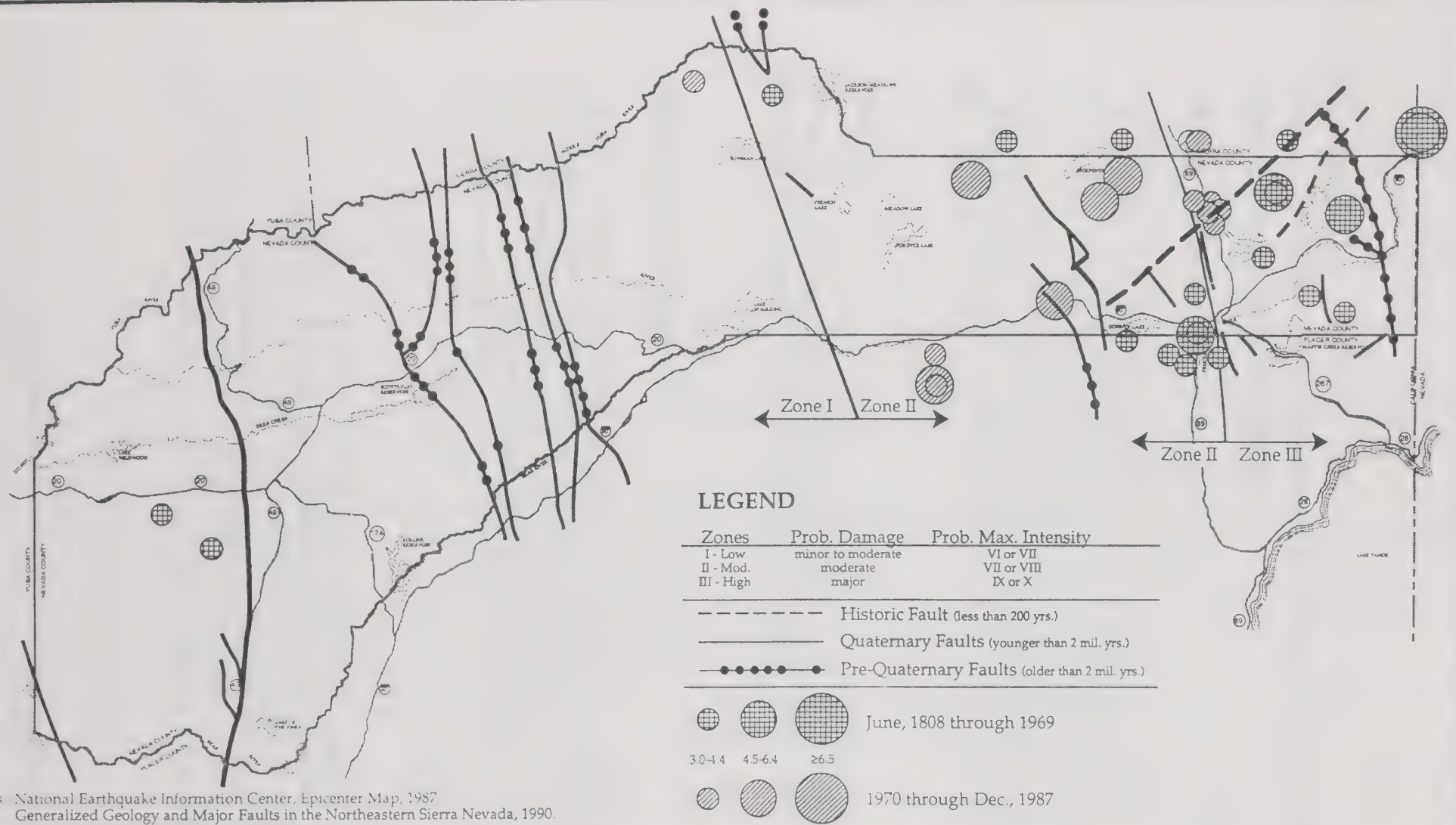
The Draft Land Use Plan proposes significant growth over existing conditions. Buildout of the Draft Land Use Plan would result in more residential and non-residential uses in the Town. These increases generate a larger population, as well as more employees in the Town. Since the entire Truckee area is considered a high fire hazard zone, General Plan policies should require adequate emergency access and fire flow before development is allowed to proceed.

### **Alternatives**

Fire hazards under the alternatives would be similar to those under the Draft Land Use Plan, but the population exposed to the hazard would be smaller under both alternatives.







Sources: National Earthquake Information Center, Epicenter Map, 1987  
 Generalized Geology and Major Faults in the Northeastern Sierra Nevada, 1990.  
 O.E.S. Emergency Operations Plan, 1990.

## FIGURE A: EARTHQUAKE FAULTS AND EPICENTERS IN NEVADA COUNTY

Source: Nevada County Master Environmental Inventory, Harland Bartholemew and Associates, December 1991



# ***HAZARDS***

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## **SNOW AVALANCHE HAZARDS**

### **Draft Land Use Plan**

In the Truckee area, potential snow avalanche areas exist on the east and west edges of Donner Lake and in the area north of Interstate 80 and east of State Highway 89. The potential snow avalanche areas are primarily red and blue zones, which indicate high and moderate avalanche potential. The Draft Land Use Plan would allow limited new infill development in areas subject to avalanche hazards. Current ordinance requirements appropriately and adequately address avalanche hazard, however the avalanche studies should be reviewed and updated if necessary to reflect any change in conditions.

### **Alternatives**

Since the areas subject to avalanche are largely either developed or subdivided, the impact related to avalanche hazard would be the same for each of the alternatives as under the Draft Land Use Plan.

## **AIRPORT HAZARDS**

The Airport Land Use Commission designates airport safety areas, including safety areas at the Truckee-Tahoe Airport. Some industrial buildings are located south of Runways 28L and 10R, but the buildings do not encroach in any of the safety areas. There is one residential neighborhood (1-2 du/ac density) located at the foot of Safety Zone 2 for Runway 10R. Open space uses are located north of the airport and airport safety zones.

### **Draft Land Use Plan**

Proposed uses under the Draft Land Use Plan are sensitive to the airport. The Plan designates industrial, commercial, residential, open space and public lands in the vicinity of the Truckee-Tahoe Airport. In general, these uses are compatible with the airport. Future projects within or immediately adjacent to safety zones 1 and 2, should be submitted to the Truckee Tahoe Airport District to ensure their compatibility with the airport. In addition, projects proposed within safety zone 3 should implement measures that would ensure noise and safety compatibility with the airport.



# HAZARDS

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## Alternatives

Development around the airport would be similar under each of the alternatives, and therefore the impact related to airport hazard would be the same for each of the alternatives as under the Draft Land Use Plan.

## WATER QUALITY

The primary source of all domestic and fire protection water in Truckee is groundwater. Groundwater quality is monitored by the PUD. Water quality is regulated by the California Regional Water Quality Control Board (RWQCB), Lahontan Region.

The Truckee River and Martis Creek are designated as "water quality limited segments under Section 303(d) of the Clean Water Act due to elevated metals levels in fish tissue. According to the Lahontan Region, a similar designation is pending for Donner Lake due to metals, PCBs, and the pesticide chlordane in fish. Section 303(d) listing required the RWQCB to perform wasteload allocations and adopt Total Maximum Daily Loads (TMDLs) of pollutants to ensure attainment of water quality standards. The RWQCB staff are currently sampling, metals in the Truckee River watershed. The TMDL process could lead to requirements for implementation of additional Best Management Practices (BMPs) to reduce metals loading to surface waters from sources such as urban and highway runoff.

The Lahontan Region of the California Regional Water Quality Control Board has adopted a new *Water Quality Control Plan for the Lahontan Region*, which took effect in March, 1995. The new plan includes some revision in water quality standards applicable to the Truckee River, and new language which clarifies the applicability of some of the water discharge prohibitions. Under the new plan, all surface and ground waters of the Truckee River watershed are now designated for the municipal and domestic supply beneficial use, and are considered "sources of drinking water" for purposes of implementing Proposition 65.

The RWQCB's Truckee River waste discharge prohibitions related to domestic wastewater disposal include prohibitions against discharges from new development using septic systems, with limited exemption criteria resulting in an allowable density of about one unit/2.5 acres, and against discharges containing greater than 9 mg/l nitrogen, the effluent concentration achieved by the Tahoe-Truckee Sanitation Agency's (TTSA's) tertiary treatment process. New development such as PC-2, at densities of 4 units per acre, would not meet Lahontan's septic system exemption criteria. General Plan policies will require sewer connection.

The Lahontan RWQCB has adopted Memoranda of Understanding (MOUs) with most local

**TOWN OF TRUCKEE  
GENERAL PLAN  
and  
ENVIRONMENTAL IMPACT REPORT**

**VOLUME II:  
Final Technical Appendix**

**Part 4 - General Plan Traffic Study**



## ***HAZARDS***

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governments within its jurisdiction regarding the implementation of its septic system criteria. These MOUs delegate most of the implementation process to local agencies. The RWQCB has suggested that if the Town expects to have significant new development on septic systems under the General Plan, it may wish to enter into a MOU with the region.

All new development and construction will affect water quality and groundwater recharge. Road construction, new urban development, and any construction increasing the impervious surfaces in the Town will reduce groundwater recharge. Runoff resulting from increase population and activity will potentially affect both groundwater and surface water quality. General Plan policies should address these issues.

### **Alternatives**

The Low Growth Alternative and the No Project Alternative would both result in a lesser increase in impervious surfaces and urban runoff than the Draft Land Use Plan. Potential impacts would be proportionally less.





**TOWN OF TRUCKEE  
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and  
ENVIRONMENTAL IMPACT REPORT**

**VOLUME II:  
Final Technical Appendix**

**Part 4 - General Plan Traffic Study**



# **FINAL TOWN OF TRUCKEE TRANSPORTATION MODEL**

*Prepared For:*

**Town of Truckee  
Community Development Department  
11570 Donner Pass Road  
Truckee, CA 96161**

*Prepared By:*

**Pacific Traffic and Transportation Engineers  
3547 Koso Street  
Davis, CA 95616**

December 1995

037-94-0001





## INTRODUCTION/SUMMARY

The object of this study is to evaluate the traffic operation of the arterial and major collector street system serving the Town of Truckee. The traffic and circulation report was prepared by the firm of Pacific Traffic and Transportation Engineers. The study's main components were defined cooperatively with staff from the Town of Truckee and The Planning Center. The purpose of the study is to define existing traffic operations, analyze the traffic impacts of future development (completion of the State Route 267 Bypass and General Plan buildout), evaluate the impacts of possible roadway alternatives and to determine mitigation strategies relating to identified negative traffic impacts. The assessment of existing traffic conditions was completed using traffic data obtained from previous traffic studies and field data collected by PacTrans staff. Future traffic conditions were estimated using TModel2, a traffic simulation model developed for long-range transportation planning which enabled the estimation of future traffic volumes.

Much of the analysis conducted as part of this study has described the operation of 20 major existing and future intersections located in the Town of Truckee area. Potential improvements to the arterial and major collector street system were related to identified intersection deficiencies. This study has focused on the potential traffic impacts of growth to the primary and secondary streets serving the Town of Truckee. However, traffic impact studies conducted in the future for specific individual development projects should address localized site impacts, as well as impacts to the major street system.

To complete the analysis of the existing and future traffic conditions in the Town of Truckee area it was necessary to make the following assumptions regarding feasible roadway or intersection improvements:

- Limit the installation of new traffic signals;
- the State Route 267 bypass will be completed by build out of the General Plan;
- at intersections, the acceptable levels of service assumed were LOS D for intersections outside the downtown area within LOS E for intersections within the downtown area;
- State Route 89-south would not be widened to more than four-lanes through Truckee. The area around the Interstate 80 interchange was exempted from this requirement;

- Donner Pass Road would not be widened to more than a three-lanes (two travel lanes and a center two-way left turn median) through Truckee;
- Improvements would be analyzed from the least expensive or intrusive to the more expensive and intensive (i.e. adding a left turn lane at an intersection instead of widening the road to four lanes).

## EXISTING CONDITION

In general, the existing circulation system operates at acceptable levels of service on normal summer weekdays. The results show that all of the existing roadway segments are currently operating at acceptable levels of service.

Using the standard methods of intersection analysis, ten intersections were identified as operating at unacceptable levels of service during the summer weekday p.m. peak hour. They are:

- Interstate 80 westbound ramps/Donner Pass Road (LOS E)
- Interstate 80 eastbound ramps/Donner Pass Road (LOS F)
- Interstate 80 westbound ramps/State Route 89 South (LOS F)
- Interstate 80 eastbound ramps/State Route 89 South (LOS E)
- State Route 89 South/West River Street (LOS F)
- Commercial Row/Bridge Street (LOS F)
- Interstate 80 westbound/State Route 89 North-State Route 267 (LOS E)
- Interstate 80 eastbound/State Route 89 North-State Route 267 (LOS E)
- State Route 267/Glenshire Drive (LOS E)
- State Route 267/West River Street (LOS F)

However, if a "weighted average" method of analysis is used to evaluate unsignalized intersections then only three intersections are projected to be operating at unacceptable levels of service. The intersections are:

- Interstate 80 westbound ramps/Donner Pass Road (LOS E)
- Interstate 80 eastbound ramps/Donner Pass Road (LOS F)
- Interstate 80 westbound ramps/State Route 89 South (LOS E)

## FUTURE CONDITION-FINAL DRAFT GENERAL PLAN

An evaluation of the Final Draft General Plan land use plan was completed to provide data on the circulation system and necessary intersection improvements. The Final Draft General Plan land uses were based on changes made to the initial proposed General Plan by the Town Council in November of 1995. Overall, the Final Draft General Plan resulted lower traffic volumes and impacts than the initial General Plan. This can be attributed to reduced land uses in PC-1, PC-2 and along Deerfield Drive.

Using the results of the traffic model, a intersection level of service analysis was completed for the twenty study area intersections. Using existing lane configurations and traffic controls at each intersection, twelve intersections were identified as operating at unacceptable levels of service during the p.m. peak hour. They are:

- Interstate 80 westbound ramps/Donner Pass Road (LOS F)
- Interstate 80 eastbound ramps/Donner Pass Road (LOS F)
- Interstate 80 westbound ramps/State Route 89 South (LOS F)
- Interstate 80 eastbound ramps/State Route 89 South (LOS F)
- State Route 89 South/West River Street (LOS F)
- Northwoods Boulevard/Donner Pass Road (LOS E)
- Extension of State Route 89/Donner Pass Road (LOS F)
- Commercial Row/Bridge Street (LOS F)
- Interstate 80 westbound/State Route 89 North-State Route 267 (LOS F)
- Interstate 80 eastbound/State Route 89 North-State Route 267 (LOS F)
- State Route 267/Glenshire Drive (LOS F)
- State Route 267/West River Street (LOS F)

With mitigation, the number of intersections projected to be operating at unacceptable levels of service is reduced to two. Both of the intersections are within the downtown study area and are restricted as to the improvements that could be added to the intersections. The two intersections are:

- Commercial Row/Bridge Street (LOS F)
- State Route 267/West River Street (LOS F)

Improvements needed to mitigate Final Draft General Plan buildout traffic impacts would include traffic signals at ten (10) existing intersections and at five (5) new intersections.



The same analysis was completed for the study area roadway segments. The results show that the following roadway segment is projected to be operating at a level of service E or worse:

- State Route 89 south of West River Road (LOS F)

A discussion of the benefits of the major proposed additions to the Final Draft General Plan circulation network are presented below:

- Deerfield Drive connector - The completion of this facility results in lower traffic volumes at the S.R. 89/Deerfield Drive intersection and on S.R. 89 north of Deerfield Drive. Higher traffic volumes are experienced at the Donner Pass Road/Cold Stream Road-I-80 eastbound ramps intersection. The system-wide impacts of this facility are minimal.
- Downtown Connector - This facility would provide a alternative connection to downtown Truckee. It results in lower traffic volumes on Northwoods Boulevard, S.R. 267 east of downtown to Interstate 80 and on Commercial Row. Increases in traffic are expected on Bridge Street and at the Commercial Row/Bridge Street intersection. With additional development north of Interstate 80 this facility would aid in system-wide traffic flow.
- Tahoe Donner Connector - This facility would provide a connection from Northwoods Boulevard to S.R. 89 at or near Prosser Dam Road. This facility results in lower traffic volumes on Northwoods Boulevard (2,270 v.p.h. vs. 1,310 v.p.h.), Donner Pass Road - east of Northwoods Boulevard (3,025 v.p.h. vs. 2,040 v.p.h.), Commercial Row (1,900 v.p.h. vs. 1,720 v.p.h.) and S.R. 267-east of downtown to Interstate 80 (2,270 v.p.h. vs. 1,900 v.p.h.). With or without either PC-2 or the downtown connector this facility has a significant positive impact on overall town circulation.
- S.R. 267 Bypass - With this facility traffic decreases as projected on existing S.R. 267, West River Road, Commercial Row and S.R 89.

## EXISTING CONDITION

### SETTING

The Town of Truckee area is a valley that is approximately twelve miles in length (east to west) and three miles in width (north to south). The major circulation features include: Interstate 80, which bisects the study area, State Route 89, which traverses the southern and northeastern edge of the study area and State Route 267, which passes north to south through the south central part of the study area (See Figure 1). The valley is generally low density rural/urban in character, with tourist related commercial uses in downtown Truckee. Geographic features, ridges, the Southern Pacific Transportation Company mainline tracks and the Truckee River, limit roadway development potential.

Listed below is a description of the major routes serving the Town of Truckee area. Each route is described in terms of amount of average daily traffic (ADT) on each street, number of lanes and general characteristics and of the adjacent area. The ADTs on the Town of Truckee circulation system are shown in Figure 2.

**Interstate 80:** Interstate 80 is a four-lane transcontinental freeway serving the north-central area of California and the United States. It is a principal route between the Town of Truckee and Sacramento, the San Francisco Bay Area and Reno. While serving as a principal roadway in the Town of Truckee, this facility creates a circulation barrier to north-south traffic. There are seven (7) interchanges/crossings with Interstate 80 in the study area.

The key features of Interstate 80 through the Town of Truckee area are presented in Table I. The distance between the six interchanges, the number of lanes, and the average daily traffic are shown in the table.

**State Route 89:** State Route 89 is a two- to four-lane roadway extending on a north to south alignment from U.S. 395 (near Topaz) to Interstate 5 (near Mt. Shasta City). In the study area, it provides access to and serves as the main access to north Lake Tahoe and the Squaw Valley and Alpine Meadows ski areas via the southern section of the highway and provides access to Sierra County and Plumas County, via the northern section of the highway. A diamond interchange exists at Interstate 80 for both the north and south sections of the highway. The southern section of the highway is restricted by a narrow undercrossing of the Southern Pacific Transportation Company railroad tracks.



PACTRANS

Location Map

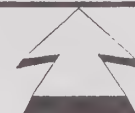
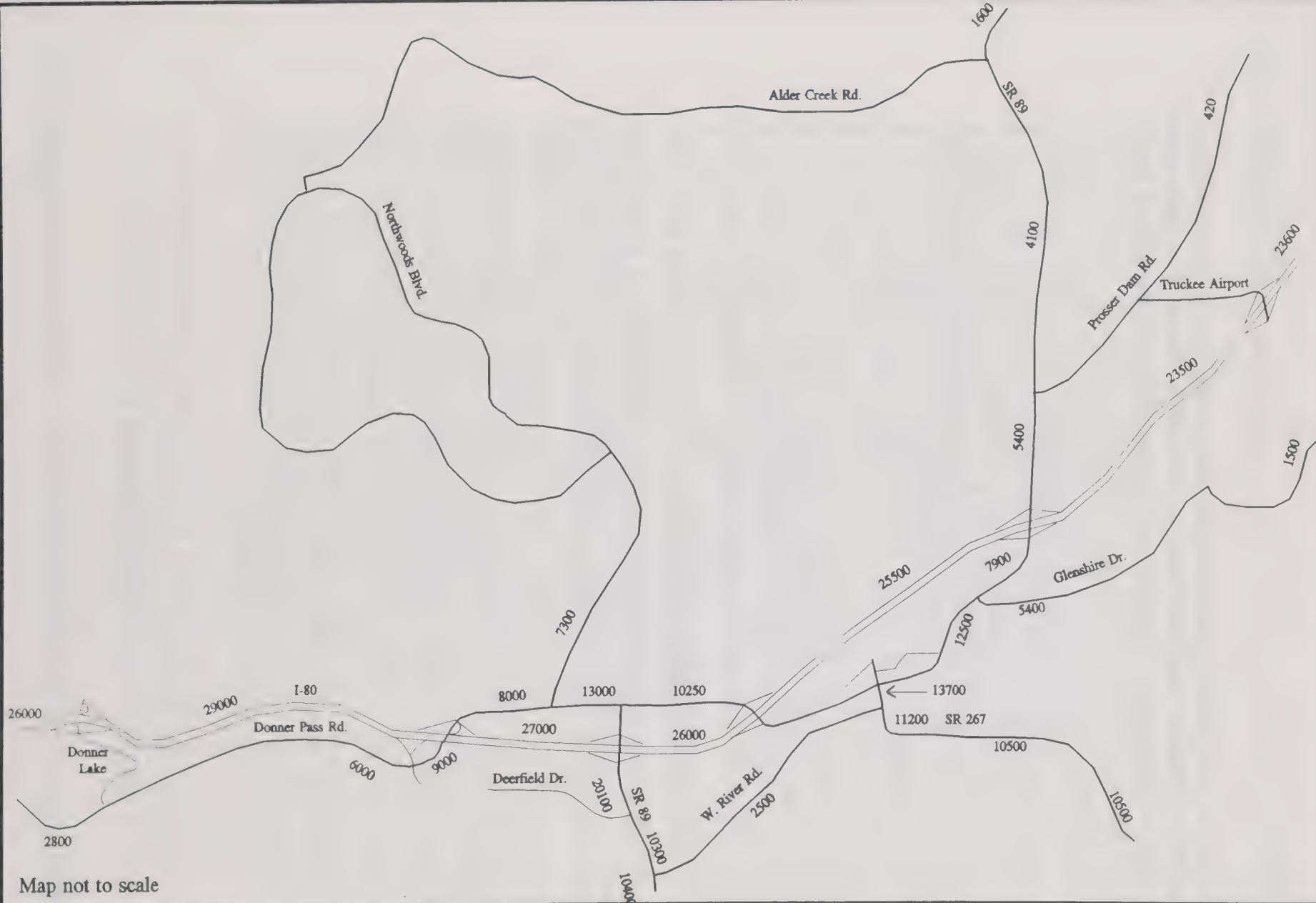


Figure 1



PACTRANS

Existing Traffic Volumes - Daily



Figure 2



Traffic volumes on the southern portion of the highway are currently 20,100 vehicles per day annually with the peak month ADT being 25,500 vehicles per day. On the northern section of the highway the average annual daily traffic is 5,400 vehicle per day with a peak month ADT of 7,400 vehicles per day.

TABLE I INTERSTATE 80 CHARACTERISTICS

Segment	Distance (Miles)	Lanes	Facility Type	Existing Annual ADT	Existing Peak ADT
West of Donner Lake Road	--	4	Freeway	26,000	35,000
Donner Lake Road to Donner Park interchange	4.20	4	Freeway	29,000	39,000
Donner Park interchange to State Route 89 south	0.95	4	Freeway	27,000	36,500
State Route 89 south to West Truckee interchange	0.81	4	Freeway	26,000	35,000
West Truckee interchange to State Route 267/89	1.32	4	Freeway	25,500	34,000
State Route 267/89 to Truckee Airport Road	1.99	4	Freeway	23,500	31,000
East of Truckee Airport Road	--	4	Freeway	23,600	31,000

Source: 1994 Traffic Volumes on California State Highways, Caltrans, July 1995.

**State Route 267:** State Route 267 is primarily a two-lane highway. It extends from Interstate 80 southeast through downtown Truckee, continuing over Brockway Summit to the north Lake Tahoe area. The route also provides access to the Northstar ski and recreation area and to the Tahoe-Truckee Airport. Located within the study area are major at-grade intersections at Glenshire Drive, Commercial Row/Bridge Street, West River Street, Old Brockway Road, Palisades Drive, Reynold Way, Martis Valley Road and Tahoe-Truckee Airport Road. The average annual ADT on State Route 267, south of downtown Truckee, is 13,700 vehicles per day with a peak month ADT of 16,900 vehicles per day. North of Tahoe-Truckee Airport Road the average annual ADT is 10,500 vehicles per day with a peak month ADT of 13,800 vehicles per day. In the downtown area of the Town of Truckee, traffic capacity is limited due to close spacing between intersections, on-street parking, heavy pedestrian activity, tourist related traffic (drivers unfamiliar with the area) and an at-grade crossing of the Southern Pacific Transportation Company mainline railroad tracks.

**Donner Pass Road:** Donner Pass Road is a two-lane east-west roadway serving the western and central Town of Truckee (as Commercial Row). The road provides access to Donner Lake State Park, the Donner Lake residential area, the high school, junior

high school and elementary school, the Gateway shopping center, Tahoe Forest Hospital and downtown Truckee. To the west Donner Pass Road provides access to the Donner Summit recreational areas. However, access is limited during the winter months. The segment of Donner Pass Road between Donner Lake Road and Donner Lake State Park has an ADT of 7,000 vehicles per day, while the ADT between Northwoods Boulevard and State Route 89 is 13,000 vehicles per day.

**Northwoods Boulevard:** Northwoods Boulevard is a north-south two-lane road that provides the main access to the Tahoe-Donner section of the town. The segment of Northwoods Boulevard between Donner Pass Road and Northwoods Boulevard receives an ADT of approximately 6,000 vehicles per day. The ADT north of Northwoods Boulevard is 4,000 vehicle per day.

**Glenshire Drive:** Glenshire Drive provides a continuous east-west linkage throughout the eastern portion of the study area. The road provides access to residential areas of Olympic Heights and Glenshire. The road has an ADT of 5,400 vehicles per day west of State Route 267 and an ADT of 1,500 vehicle per day east of Martis Peak Road.

**Prosser Dam Road:** This two-lane road provides the northeastern sections of the study area. The road provides access to the Prosser Lake Acreage and Pannonia Ranchos residential areas and the Prosser Reservoir, Stampede Reservoir and Boca Reservoir recreation areas. ADT on Prosser Dam Road is approximately 420 vehicles per day east of State Route 89.

**Alder Creek Road:** Alder Creek Road is a two-lane rural road that provides a second access to the Tahoe-Donner area of the town. Due to restrictions on trucks on Northwoods Boulevard (grades) Alder Creek Road serves as the main truck route into Tahoe-Donner. The ADT on Alder Creek Road, just west of State Route 89, is approximately 2,000 vehicles per day.

**West River Street:** West River Street is an east-west two-lane road that connects State Route 89 with State Route 267. The road provides access to residential, industrial and commercial land uses. West River Street has an ADT of approximately 2,500 vehicles per day.

Other important roads that serve local areas in the study area include: Palisades Drive, Tahoe-Truckee Airport Road, Jibboom Street, Church Road, Martis Valley Drive, Schussing Way, and Donner Lake Road.

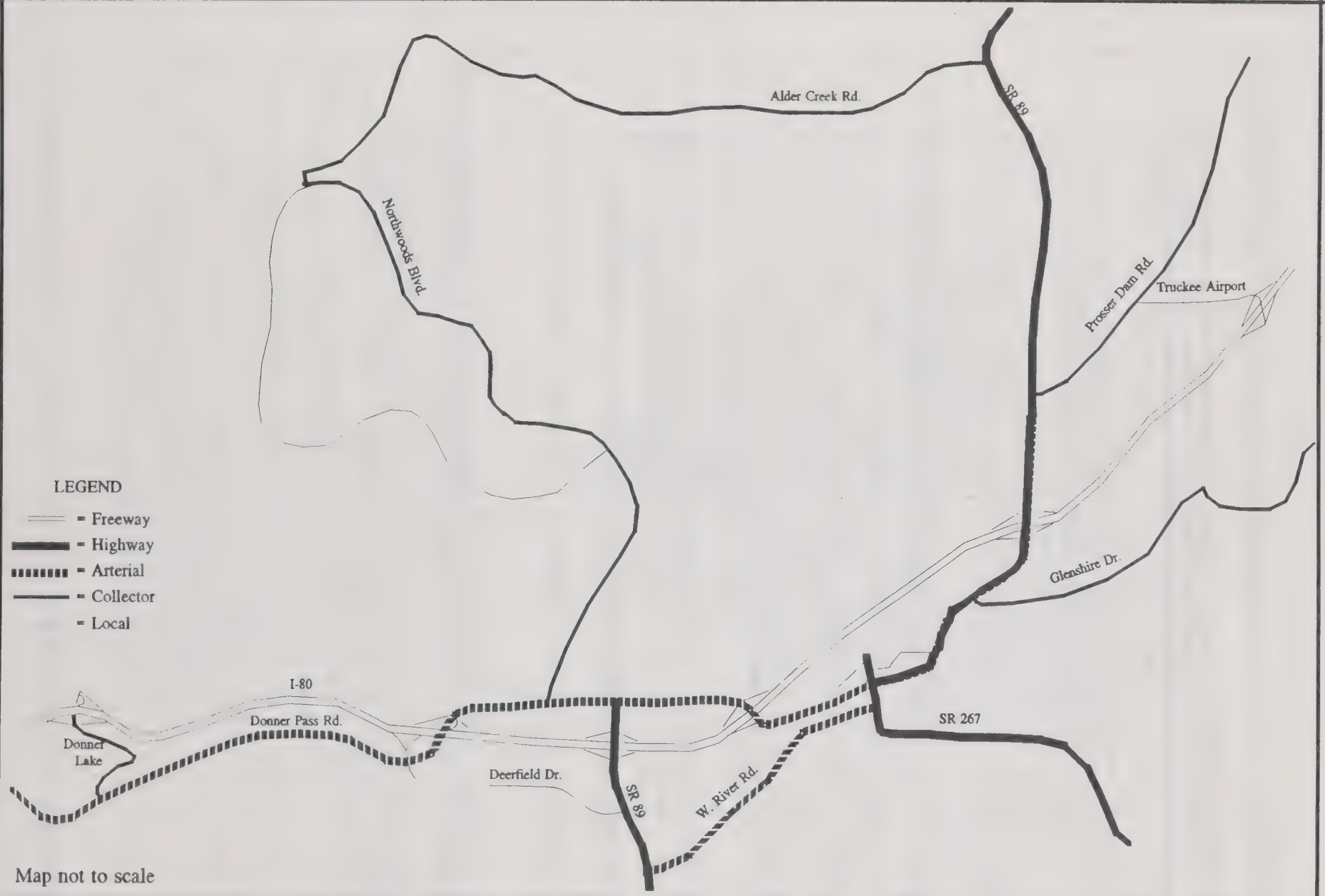
## TOWN OF TRUCKEE ROADWAY CLASSIFICATION

A system of roadway classification was developed by the County of Nevada, Transportation Department. The system categorized Town of Truckee roadways (non-State Highways) as arterial, collector or local roads. The State Highways are classified as either freeway or highway. The roadway classification system is defined in Table II. The capacity values for State Route 89 were taken from State Route 89 Route Concept Report, Caltrans District 3. The roadway capacity values for State Route 267 were taken from Draft Environmental Impact Statement State Route 267 Truckee Bypass, Caltrans District 3. Figure 3 shows the roadway classification of the roads within the study area.

TABLE II DEFINITIONS OF ROADWAY CLASSIFICATIONS			
Roadway Classification	Purpose and Design Factors	Design Capacity (PHT)	
		2 Lane	4 Lane
Freeway	Designed to serve regional traffic. Facility would be grade separated and have limited access	3,000	6,500
Highway	Roadways designed to serve regional traffic and to serve primarily non-residential land uses. Roadways should have a minimum of 12 foot lanes and limited driveway access.	1,900	3,800
Arterial	Roadways designed to serve primarily non-residential land uses. Roadways should have a minimum of 12 foot wide lanes with shoulders and few curb cuts. Traffic control would be spaces at one mile or more intervals.	1,800	3,500
Collector	Roadway designed to serve both non-residential and residential land uses. More frequent driveways are acceptable. Traffic control at 1/4 mile intervals.	1,000	--
Local	Roadways designed to serve residential and non-residential land uses. Roadways would be two-lane with close to moderately spaced driveways.	950	--

Notes: See Figure 3 for location of roadways by roadway classification.

Operating conditions on streets and at intersections are described by a measurement called level-of-service, which is derived by comparing the traffic volumes on the roadway with the capacity of the facility. The quality of traffic operation is graded into one of six levels: A, B, C, D, E and F, with LOS A being the best or free flow conditions and LOS F being the worst or over capacity conditions. Table III provides a description of the six level-of-service conditions.



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Roadway Classifications



Figure 3



TABLE III SUMMARY OF LEVEL OF SERVICE FOR INTERSECTIONS

Level of Service	Type of Flow	Delay	Maneuverability	V/C Ratio
A	Free Flow	Very Slight or no delay. If signalized conditions are such that no approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.	Turning movements are easily made, and nearly all drivers find freedom of operation.	0.00-0.60
B	Stable Flow	Slight delay. If signalized, an occasional approach is fully utilized.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	0.61-0.70
C	Stable Flow	Acceptable delay. If signalized, a few drivers arriving at the end of a phase may have to wait through one signal cycle.	Back-ups may develop behind turning vehicle. Most drivers feel somewhat restricted.	0.71-0.80
D	Approaching Unstable Flow	Tolerable delay. Delays may be substantial during short periods, but excessive delays do not occur.	Maneuverability is severely limited during short periods due to temporary back-ups.	0.81-0.90
E	Unstable Flow	Intolerable delay. Delay may be great. Up to several signal cycles.	There are typically long queues of vehicles waiting upstream of an intersection..	0.91-1.00
F	Forced Flow	Excessive delay.	Jammed conditions. Back-ups from other intersections restrict or prevent movement.	> 1.00

Source: Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985.

Intersection level-of-service is determined differently for signalized, multi-way STOP and unsignalized controlled intersections.

For signalized intersections, the level-of-service is calculated using the methodology described in the Interim Materials on Highway Capacity, Circular 212, Transportation Research Board, 1980, which evaluates intersection operation in terms of volume/capacity ratios. Factors in the calculation include the number of approach lanes traffic turning movements and signal phases. Table IV shows the capacity for signalized intersections.

TABLE IV LEVEL OF SERVICE GUIDELINES FOR SIGNALIZED INTERSECTIONS			
Level of Service	Sum of Critical Lane Volumes (veh/critical lane/hour)		
	2 Phase Signal	3 Phase Signal	4 Phase Signal
A	0-900	0-855	0-825
B	901-1050	856-1000	826-965
C	1051-1200	1001-1140	966-1100
D	1201-1350	1141-1275	1101-1225
E	1351-1500	1276-1425	1226-1375
F	> 1501	> 1426	> 1376

Source: Interim Materials on Highway Capacity, Circular 212, Transportation Research Board, 1980.

The level of service evaluation of the multi-way STOP sign controlled intersections was completed using the method of analysis presented in Interim Materials on Unsignalized Intersection Capacity, Circular 373, Transportation Research Board, 1991. This method assumes the capacity of a four-way STOP sign controlled intersection to be a function of the conflicting traffic movements at the intersection and the number of approach lanes. Table V shows the LOS guidelines at multi-way STOP sign controlled intersections.

TABLE V LEVEL OF SERVICE GUIDELINES FOR FOUR-WAY STOP CONTROLLED INTERSECTIONS	
Level of Service	Delay (seconds)
A	$\leq 5.0$
B	5.1 to 10.0
C	10.1 to 20.0
D	20.1 to 30.0
E	30.1 to 45.0
F	> 45.0

Source: Circular 373: Interim Materials on Unsignalized Intersection Capacity, Transportation Research Board, 1991.

For non-signalized intersections, the level-of-service is described in terms of available capacity for the conflicting traffic movements. The method of analysis used in this study is presented in Highway Capacity Manual, Special Report 209, Transportation Research Board, 1985. Table VI shows the capacity for analysis of an unsignalized intersection. The method of analysis presented in Highway Capacity Manual, Special Report 209, analyzes the traffic movements from the minor street and left turns from the major street and provides the Reserve Capacity (RC) and level of service (LOS) for those movements in terms of critical gap acceptance and delay. The method does not present an overall intersection LOS. To accomplish this, this report has used a weighted average analysis method that utilizes the Reserve Capacity for each of the movements evaluated by the Highway Capacity Manual method and the traffic volume for that movement.

The intersection Reserve Capacity is obtained by multiplying the Reserve Capacity for a movement by the traffic volume for that movement; summing those products; and dividing the sum by the sum of the traffic volumes evaluated for the intersection.

TABLE VI LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS		
Reserve Capacity	Level of Service	Expected Delay to Minor Street Traffic
400 (or more)	A	Little or no delay.
300-399	B	Short traffic delays.
200-299	C	Average traffic delays.
100-199	D	Long traffic delays.
0-99	E	Very long traffic delays.
<0	F	Extreme traffic delays.

## TRAFFIC ANALYSIS

### ROADWAY SEGMENTS

Twenty five roadway segments have been identified as critical roadway segment within the study area. Each of the segments have been evaluated to determine their existing level of service. The level of service analysis used existing p.m. peak hour summer traffic data (see Figure 4). The results of the roadway segment level of service analysis are presented in Table VII. The results show that all of the existing roadway segments are currently operating at acceptable levels of service.

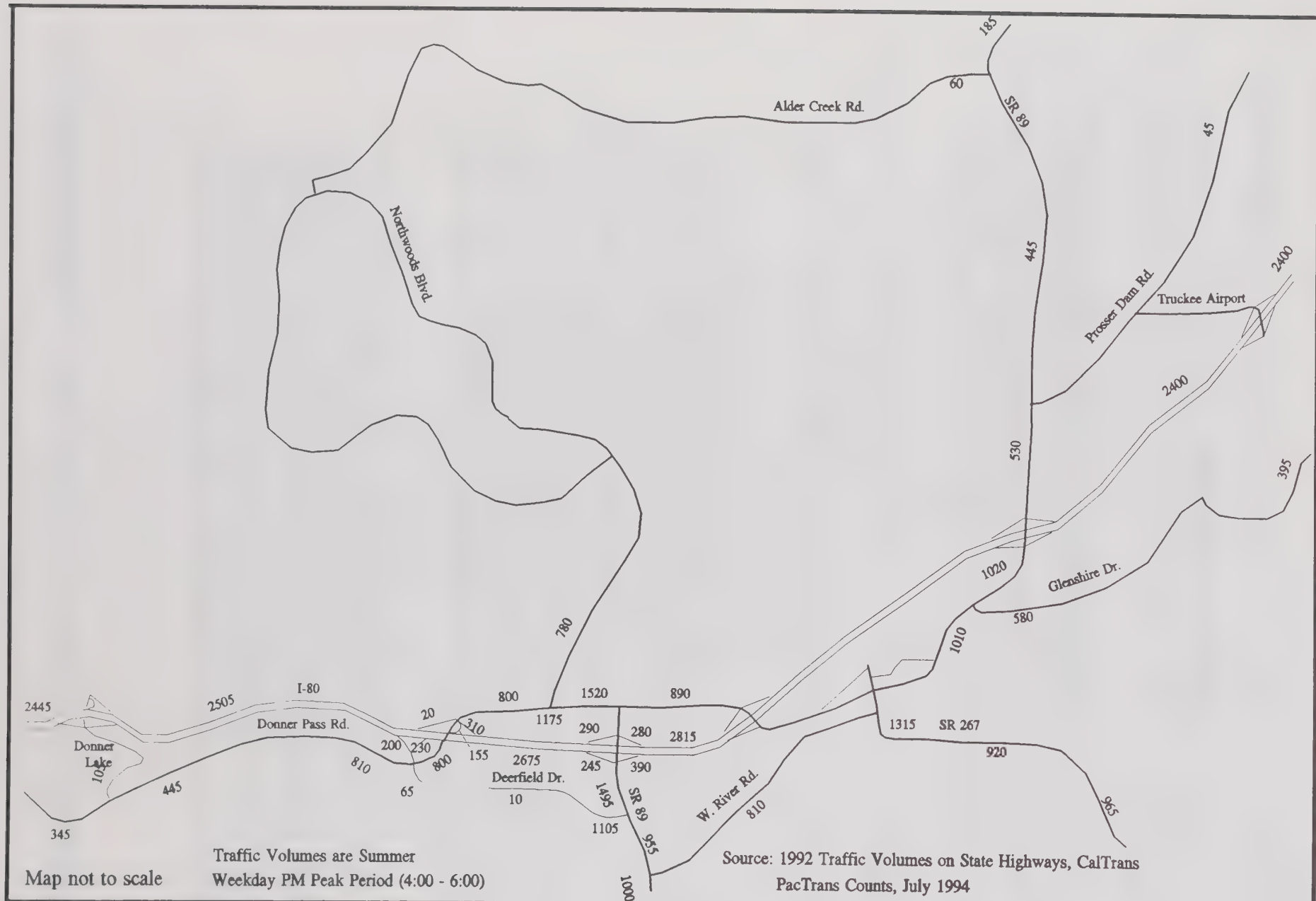
### INTERSECTIONS

Fifteen existing intersections were identified as critical area-wide traffic facilities, for this study. Figure 5 shows the location of the critical intersections.

Each of the critical intersections has been field reviewed to identify the present number of approach lanes and type of traffic control. Three of the intersections are presently controlled by traffic signals (Northwoods Boulevard/Donner Pass Road, Donner Pass Road/State Route 89 and Deerfield Drive/State Route 89); one is controlled by STOP signs on all of the intersection approaches (Interstate 80 westbound ramps/Donner Pass Road) and eleven are controlled by STOP signs on the minor street approaches (State Route 89/I-80 eastbound ramps, State Route 89/I-80 westbound ramps, State Route 89/West River Street, State Route 267/Glenshire Drive, State Route 267/West River Street, I-80 eastbound ramps/Donner Pass Road, I-80 westbound ramps/Donner Pass Road-Central Truckee, I-80 eastbound ramps/Donner Pass Road-Central Truckee, State Route 89-267/I-80 westbound ramps, State Route 89-267/I-80 eastbound ramps and Commercial Row/Bridge Street).

Table VIII summarizes the intersection characteristics and the p.m. peak hour analysis of the intersection operating condition for each of the fifteen existing intersections. The analysis is based upon the projections from the existing condition transportation model. The intersection turning movement projections were verified with actual field counts, where field data was available. The table presents the intersection volume to capacity ratio (V/C) for all intersections, reserve capacity (RC) for all unsignalized intersections and the associated intersection level-of-service (LOS). The existing condition intersection LOS analysis was completed to provide a base





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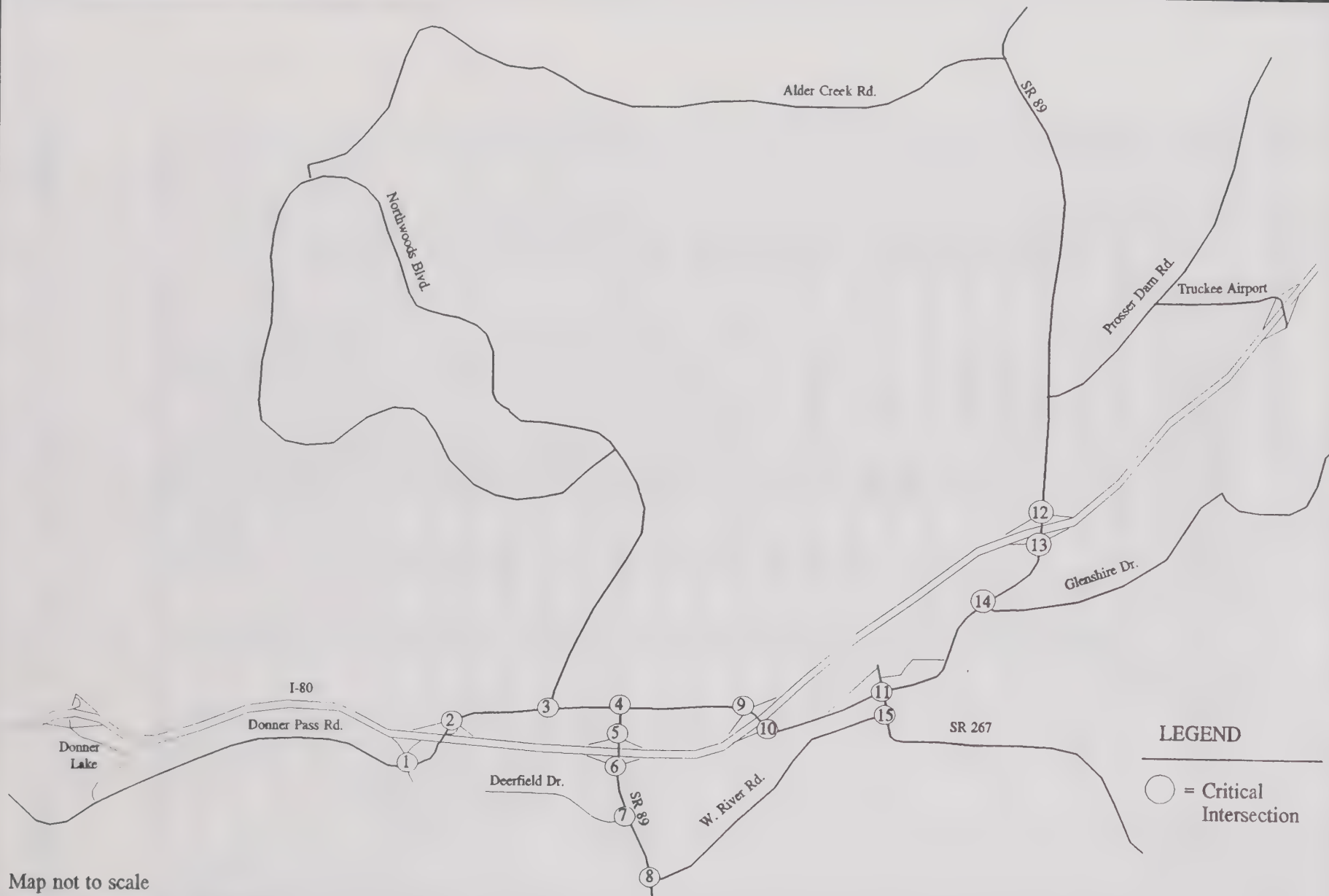
Existing Traffic Volumes - PM Peak



Figure 4

TABLE VII ROADWAY SEGMENT ANALYSIS-EXISTING CONDITION

Roadway (Location)	P.M. Peak Hour Traffic Volume	Roadway Classification	Number of Lanes	Level of Service
I-80 (w/o Donner Lake Rd.)	2,440	Freeway	4	B
I-80 (w/o Donner Pass Rd.)	2,500	Freeway	4	B
I-80 (w/o S.R. 267/89)	2,810	Freeway	4	B
I-80 (e/o Truckee Airport Rd.)	2,400	Freeway	4	A
S.R. 267 (s/o I-80)	1,020	Highway	2	B
S.R. 267 (s/o Commercial Row)	1,310	Highway	2	B
S.R. 267 (n/o Tahoe-Truckee Airport)	920	Highway	2	B
S.R. 89 (s/o Donner Pass Rd.)	1,300	Highway	4	B
S.R. 89 (s/o I-80)	1,900	Highway	4	B
S.R. 89 (s/o West River)	1,000	Highway	2	C
S.R. 89 (n/o I-80)	530	Highway	2	A
S.R. 89 (n/o Alder Creek Rd.)	190	Highway	2	A
Donner Pass (w/o Donner Lake Rd.)	350	Arterial	2	B
Donner Pass (w/o Cold Stream Rd.)	810	Arterial	2	C
Donner Pass (w/o Northwoods)	800	Arterial	2	C
Donner Pass (e/o S.R. 89)	890	Arterial	2	C
Commercial Row (w/o S.R. 267)	1,100	Arterial	2	D
Northwoods Blvd (n/o Donner Pass)	780	Collector	2	C
Northwoods Blvd (n/o Northwoods)	500	Collector	2	C
Northwoods Blvd (w/o Northwoods)	260	Local	2	B
Glenshire Dr (e/o S.R. 267)	580	Collector	2	C
Prosser Dam Rd. (e/o S.R. 89)	60	Collector	2	A
Alder Creek Rd. (w/o S.R. 89)	60	Collector	2	A
Deerfield Dr (w/o S.R. 89)	1,100	Arterial/Collector	2	C
West River Rd. (e/o S.R. 89)	810	Arterial	2	B



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Critical Intersections



Figure 5

from which future land use scenarios and roadway network alternatives can be evaluated. The key factor in this transportation analysis is to evaluate the impact or net change in intersection or roadway level-of-service from existing conditions.

As shown in Table VIII, none of the three signalized intersections operate at unacceptable levels of service during the p.m. peak hour. However, nine of the eleven unsignalized intersections and the one multi-way STOP controlled intersection were identified as operating at unacceptable levels-of-service.

TABLE VIII P.M. PEAK HOUR INTERSECTION LEVEL OF SERVICE-EXISTING CONDITION				
Intersection	Traffic Control	Movement	V/C Ratio, Delay or Reserve Capacity	Level of Service
1. I-80 eb ramps/Donner Pass	Multi-way STOP	All	30	E
2. I-80 wb ramps/Donner Pass	Unsignalized	All	-26	F
3. Northwoods/Donner Pass	Signal	All	0.50	A
4. S.R. 89/Donner Pass	Signal	All	0.68	B
5. S.R. 89/I-80 wb ramps	Unsignalized	All	-305	F
6. S.R. 89/I-80 eb ramps	Unsignalized	All	11	E
7. S.R. 89/Deerfield	Signal	All	0.39	A
8. S.R. 89/W. River	Unsignalized	All	-73	F
9. I-80 wb ramps/Donner Pass (dwtn)	Unsignalized	All	100	E
10. I-80 eb ramp/Donner Pass (dwtn)	Unsignalized	All	3	E
11. Commercial Row/Bridge	Unsignalized	All	-343	F
12. I-80 wb ramps/S.R. 89-267	Unsignalized	All	51	E
13. I-80 eb ramps/S.R. 89-267	Unsignalized	All	97	E
14. S.R. 267/Glenshire	Unsignalized	All	43	E
15. S.R. 267/W. River	Unsignalized	All	-148	F

The results of the intersection analysis indicate that all of the currently unsignalized would need some form of additional traffic control, most likely a traffic signal, for the intersection to operate at an acceptable level of service. The installation of traffic signals at ten intersections is very expensive and may be unneeded at a number of intersections.



At most of the intersections operating at unacceptable levels of service it is one traffic movement that is operating at an unacceptable level of service and all other movements are operating at acceptable levels of service. The question then becomes, do you penalize all other movements at an intersection, through added delay, to reduce delay for one traffic movement? In general, the answer is, no. Described on page ten (10) of this report is an alternative method to determine the overall operating condition at an unsignalized intersection. Table IX presents a comparison of this method (weighted average) with the standard unsignalized intersection capacity results. The weighted average method uses the results of the standard unsignalized intersection capacity method, but takes the results one step further. From, Table IX it can be seen that number of unsignalized intersections operating at unacceptable levels of service is reduced from ten intersections to two intersections.

TABLE IX COMPARISON OF UNSIGNALIZED INTERSECTION LEVEL OF SERVICE-EXISTING CONDITION				
Intersection	Highway Capacity Manual Method		Weighted Average Method	
	Reserve Capacity	Level of Service	Reserve Capacity	Level of Service
I-80 wb ramps/Donner Pass	-26	F	-23	F
S.R. 89/I-80 wb ramps	-305	F	83	E
S.R. 89/I-80 eb ramps	11	E	257	C
S.R. 89/W. River	-73	F	146	D
I-80 wb ramps/Donner Pass (dwn)	100	E	256	C
I-80 eb ramp/Donner Pass (dwn)	3	E	3	E
Commercial Row/Bridge	-343	F	250	C
I-80 wb ramps/S.R. 89-267	51	E	309	B
I-80 eb ramps/S.R. 89-267	97	E	425	A
S.R. 267/Glenshire	43	E	350	B
S.R. 267/W. River	-148	F	258	C

## PLANNED CIRCULATION IMPROVEMENTS

There currently are two major projects located in or near the Town of Truckee. The projects are the reconstruction of the bridge over the Yuba River on Donner Pass Road and construction of the State Route 267 bypass. Figure 6 shows the location of the potential improvements.

## **TRANSIT SERVICE**

The Town of Truckee is currently served by the following transit services:

- "The Bus", which is operated by Tahoe Area Regional Transit and provides service between Truckee and Tahoe City, with service to Squaw Valley,
- High Sierra Senior Services, operated by Tahoe Forest Hospital and provides daily service to seniors within the Truckee/Northstar area,
- "Truckee Trolley", which is operated by the Town of Truckee and provides transit service during the summer months.
- Taxi Service, provided by five local taxi firms,
- Tourist Related Transit, is provided by all of the major ski areas, except for Boreal.
- Regional Transit, provided by bus (Greyhound) and Rail (Amtrak).

Through the calibration of the model the existing mode split serviced by Town of Truckee Transit was accounted for. It was assumed that the future level of transit service would remain similar to existing levels.



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Location of Planned Roadway  
Improvements



Figure 6

## **FUTURE TRAFFIC CONDITIONS**

### **METHOD FOR PROJECTING FUTURE TRAFFIC CONDITIONS**

This section describes the process used to develop the Town of Truckee transportation model. The purpose of developing a transportation model is to provide a tool which can be used to assess future transportation impacts of land use growth or changes in the circulation network. The model allows the simulation of future traffic conditions from which impacts can be determined and appropriate mitigation identified and evaluated.

The Town of Truckee area was modeled using a computerized network modeling software package (TModel2). The base roadway network data was acquired from field studies. Land use information used as input into the land use data files was provided by field studies, previous traffic studies in the study area and The Planning Center staff. All of the information developed exists in computer file format in TModel2 files.

The modeling process developed for this study involved four major steps:

- Construction of a computerized street network system;
- Developing a computerized land use zone system and data base;
- Calibrating the traffic simulation model; and
- Using the model to test alternative (land use or network) scenarios.

The process is described further described in the next sections.

### **Network Development**

A computerized representation of the Town of Truckee area street network was developed. The street network is comprised of street segments called links and intersections called nodes. Separate link and node files were constructed and combined within the TModel2 software package to produce the Town of Truckee model street network. The nodes have been assigned xy coordinates which will enable visual inspection and network modification, if desired.

The Town of Truckee street map served as the base for establishing the computer network. All streets were inventoried to obtain posted speed limits and number of lanes. The links were then coded into computer files. The files contain information including: functional classification, speed, capacity, number of lanes, one-way or two-way and length (miles). The roadway network



functional classification was developed from information provided by the County of Nevada Transportation Department. Figure 3 shows the functional classification of roadways in the Town of Truckee area.

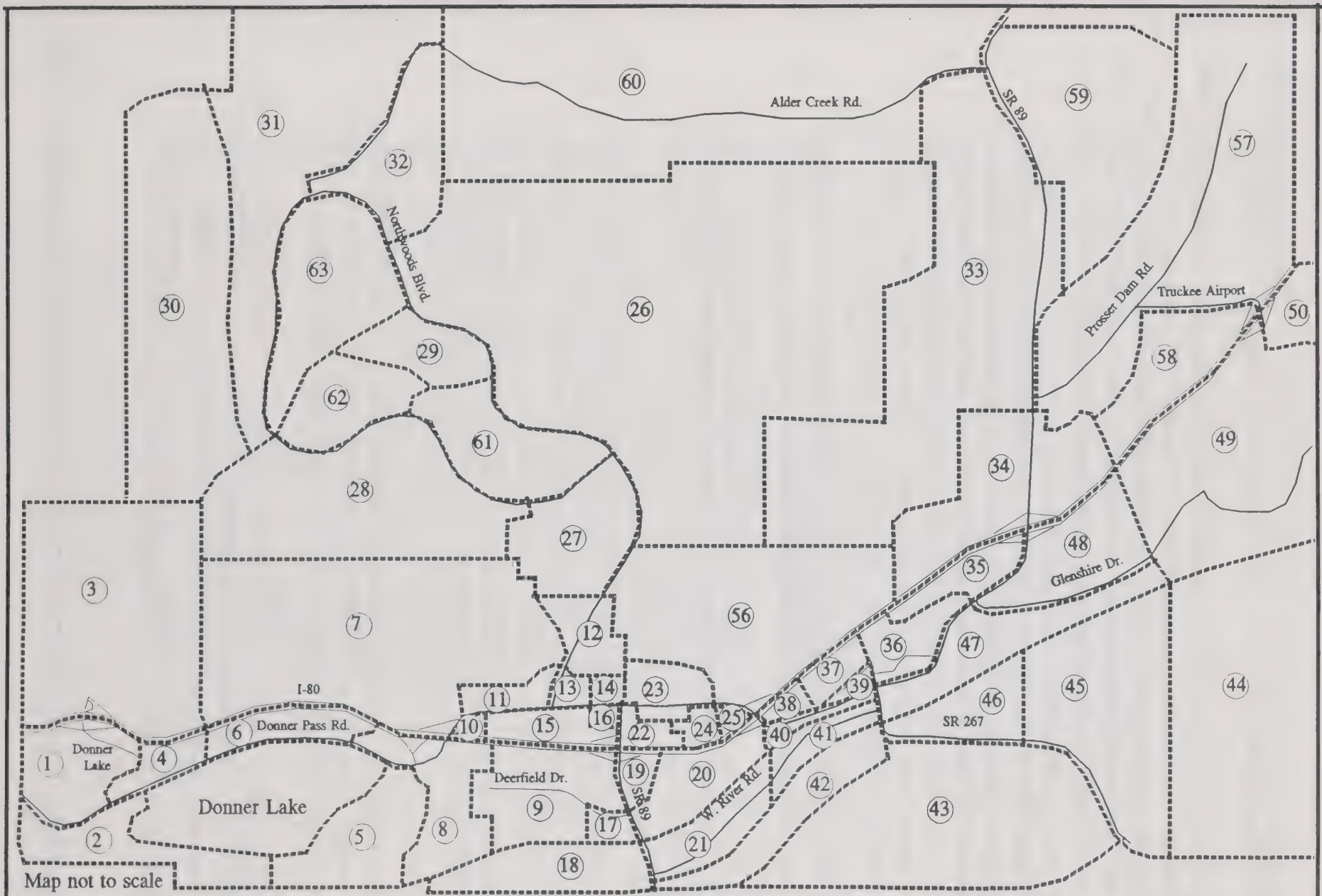
### Land Use Zone System

The study area was subdivided into 64 smaller areas, called traffic analysis zones. The zone boundaries were determined by changes in land use, physical boundaries (ridges, rivers, railroads and roadways) and census boundaries. Land use within the study area was assigned to a traffic zone. The land use data was further separated into 15 categories (5 residential and 10 non-residential). Table X shows the land use categories. Figure 7 shows the traffic zone map.

TABLE X LAND USE CATEGORIES	
Residential	Non-Residential
Single-Family/Full-time(Dwelling Unit)	Light Industrial/Office (Employee)
Multi-Family/Full-time (Dwelling Unit)	Public & Medical/Dental Office (Employee)
Mobile Home (Dwelling Unit)	Hospital (Employee)
Single-Family/Vacation (Dwelling Unit)	Airport (Employee)
	Motel/High School (Employee)
	Highway Commercial (Employee)
	Community Commercial (Employee)
	Elementary/Junior High School (Employee)
	Golf Course (Hole) & Recreational (Employee)
	Park/RV Camp (Employee)

### Modeling Procedure

The Town of Truckee area transportation model was developed in order to obtain existing and future p.m. peak hour summer weekday traffic volumes. In order to accomplish this, the trip-making characteristics associated with each type of land use and each traffic zone had to be determined. The number of trips to and from each transportation zone was estimated by multiplying the land use factor associated with the zone by the appropriate trip generation rate. Base trip generation rates were obtained from Trip Generation, Fifth Edition, Institute of



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Zone Map



Figure 7

Transportation Engineers, 1990. The final trip generation rates were adjusted during the model calibration to simulate trip generation characteristics in Truckee. Thus, accounting for the difference between the model trip rates and ITE rates. Table XI shows the trip generation rates used in the model. Once the traffic zone origins and destinations were calculated, they were distributed between the traffic zones and external cordons using a standard gravity model. The gravity model assigns trips from zone-to-zone based on the size of the zone and the distance in travel time to the zone. The result of the gravity model is a zone-to-zone trip table which could be used to assign trips to the model street network. In calibrating the transportation model the street network (speeds) and trip generation/distribution files were adjusted until the model traffic projections reasonably closely replicated existing traffic volumes (field counts). The existing traffic data was acquired from the County of Nevada, previous traffic studies in the study area, PacTrans traffic counts and Caltrans.

TABLE XI TRIP GENERATION RATES

Land Use	Trip Generation Rate		
	Total	Origin	Destination
Single Family (Full Time) Residential	0.60 TE/DU	0.22 TE/DU	0.38 TE/DU
Multi Family (Full Time) Residential	0.36 TE/DU	0.13 TE/DU	0.23 TE/DU
Mobile Home	0.33 TE/DU	0.12 TE/DU	0.21 TE/DU
Single Family (Vacation) Residential	0.41 TE/DU	0.15 TE/DU	0.26 TE/DU
Multi-Family (Vacation) Residential	0.43 TE/DU	0.16 TE/DU	0.27 TE/DU
Light Industrial/Office	0.75 TE/Emp	0.60 TE/Emp	0.15 TE/Emp
Public/Medical Dental Office	1.00 TE/Emp	0.67 TE/Emp	0.33 TE/Emp
Hospital	0.29 TE/Emp	0.19 TE/Emp	0.10 TE/Emp
Airport	3.50 TE/Emp	1.86 TE/Emp	1.64 TE/Emp
Motel/High School	0.77 TE/Emp	0.37 TE/Emp	0.75 TE/Emp
Highway Commercial	1.50 TE/Emp	0.75 TE/Emp	0.75 TE/Emp
Community Commercial	3.00 TE/Emp	1.50 TE/Emp	1.50 TE/Emp
Elementary/Junior High School	0.30 TE/Emp	0.18 TE/Emp	0.12 TE/Emp
Golf Course/Recreation	3.33 TE/Emp	2.00 TE/Emp	1.33 TE/Emp
Park/RV Camp	4.75 TE/Emp	2.85 TE/Emp	1.90 TE/Emp

Notes: TE = Trip End DU = Dwelling Unit Emp = Employee



## Future Alternative Analysis

A combination of land use and circulation network alternatives were developed and evaluated using the transportation model in the process of the generation of the Draft Final General Plan for the Town of Truckee. The land use alternatives evaluated were:

- No Project - This alternative consists of completion of residential growth in the Truckee area (Tahoe Donner and Glenshire in particular). No major employment, recreational or shopping areas are planned. The circulation network would remain the same as the existing condition with the addition of the S.R. 267 Bypass.
- Low Growth - This alternative would involve significant increases in all land use categories. Growth would include build out of Tahoe Donner, development in the Cold Stream area, around the Tahoe-Truckee Airport and Glenshire area. circulation network would be the same as that in Alternative 1 as described below.
- Initial General Plan - This alternative would involve the build-out of the proposed General Plan. The circulation network would be the same as that in Alternative 1 as described below.
- Initial General Plan build-out minus PC-2 - This alternative would involve the build-out of the proposed General Plan without development of the area known as PC-2. The circulation network would be the same as that in Alternative 1 as described below.
- Initial General Plan build-out minus PC-1 - This alternative would involve the build-out of the proposed General Plan with no development in PC-1. The circulation network would be the same as that in Alternative 1 as described below.
- Initial General Plan build-out minus Joerger Property- This alternative would involve the build-out of the proposed General Plan with no development in the Joerger Property. The circulation network would be the same as that in Alternative 1 as described below.
- Initial General Plan build-out with PC-1 as a resort hotel - This alternative would involve the build-out of the proposed General Plan with the only land use in the PC-1 area being a resort hotel. The circulation network would be the same as that in Alternative 1 as described below.



A comparison of the total trip generation for the No Project, Low Growth and initial General Plan land use alternatives has been completed. The total trip generation was determined using the trip generation rates for Table XI and land use data provide by the Town of Truckee and The Planning Center staff. Table XII presents the results of the analysis. In general, the build-out of the initial proposed General Plan and Low Growth alternatives result in a significant increase in the total trip generation over the existing condition. The initial General Plan total trip generation is estimated to be 2.95 times higher than the existing level. The Low Growth alternative is projected to be 2.75 times higher. The No Project alternative increase in total Truckee trip generation is projected to be 1.43 times higher than existing levels.

In addition to the land use alternatives, there are five circulation network alternatives:

- Alternative 1 - All Roads: This alternative includes construction of the S.R. 267 Bypass, a Deerfield Drive connection to Cold Stream Road, a connection from Tahoe Donner (Northwoods Boulevard) to S.R. 89 north of Interstate 80 and a connection from the Tahoe Donner connector to downtown Truckee.
- Alternative 2 - No Deerfield Connector: All of the roads proposed in Alternative 1 are included except for the Deerfield Drive connection.
- Alternative 3 - No Downtown Connector: Completion of the S.R. 267 Bypass, Deerfield Drive connector and Tahoe Donner connector.
- Alternative 4 - No Tahoe Donner Connector: In this alternative the S.R. 267 Bypass and Deerfield Drive connector would be completed, but the Tahoe Donner and downtown Truckee connectors would not be constructed.
- Alternative 5 - No S.R. 267 Bypass: All of the local connectors proposed in alternative 1 would be completed with the exception of the S.R. 267 Bypass.

In the traffic analysis of the circulation alternatives the initial General Plan land use alternative data was used as the base.

To evaluate the relative impacts of each of the land use and circulation network alternatives the Town of Truckee traffic model was used. For all of the alternatives, the existing roadway (see Table VII) and intersection lane configurations and intersection traffic control (see Table VIII) were assumed to remain the same as the existing condition with the following exceptions:

TABLE XII P.M. PEAK HOUR TRIP GENERATION COMPARISON

Land Use	Existing Condition		No Project Alternative		Low Growth Alternative		General Plan	
	Origin	Destination	Origin	Destination	Origin	Destination	Origin	Destination
Single Family-Full Time	468	808	1,100	1,900	1,038	1,793	1,127	1,947
Multi-Family-Full Time	17	30	29	51	231	408	230	408
Mobile Home	16	27	10	17	60	106	60	106
Single Family-Part Time	319	552	817	1,417	999	1,731	1,004	1,740
Multi-Family-Part Time	59	95	101	164	113	183	113	183
Sub-Total	879	1512	2,057	2,549	2,441	4,221	2,534	4,384
Light Industry-Office	807	202	807	202	1,795	449	1,819	455
Public/Medical Office	298	147	298	147	313	154	320	157
Hospital	57	30	57	30	57	30	57	30
Airport	19	16	19	16	186	164	186	164
Hotel/High School	167	176	167	176	441	477	643	695
Hwy Commercial	347	347	347	347	1,990	1,990	2,200	2,200
Tourist/Community Commercial	1,454	1,454	1,454	1,454	3,575	3,575	3,875	3,875
Elementary/Junior High School	27	18	27	18	8	5	8	5
Golf/Recreational	146	97	146	97	664	440	662	440
State Park	140	93	140	93	114	76	114	76
Sub-Total	3,462	2,580	3,462	2,580	9,143	7,360	9,884	8,097
Total	4,341	4,092	5,519	6,129	11,584	11,581	12,418	12,481

- The S.R. 267 Bypass was assumed to be a two-lane grade separated facility with a traffic signal at its intersection with S.R. 89. Traffic signals were assumed at major intersections along the proposed S.R. 267 Bypass route (S.R. 89, Interstate 80 ramps and old S.R. 267).
- The Tahoe Donner, Deerfield Drive and downtown Truckee connector were assumed to be two-lane collector level facilities. A traffic signal was assumed at the intersection between S.R. 89 and the Tahoe Donner connector.
- The weighted average method of analysis was not used at the unsignalized intersections.

### **Traffic Analysis Results**

For the roadway segments the analysis determined the projected p.m. peak hour traffic volumes and number of lanes necessary to accommodate the traffic volumes. For the intersections, p.m. peak hour intersection levels of service have been determined using existing intersection lane configurations and traffic control. For the land use alternatives the results are presented in Table XIII (roadway segments) and Table XIV (intersections). The results indicate that build-out of either the General Plan or Low Growth alternative will result in significant degradation in traffic levels of service without improvements to the towns circulation system. The No Project alternative also results in degradation in the level of service, but not to the same level as the General Plan and Low Growth alternatives.

No development in the PC-1 area or development of a resort hotel results in reduced impacts on Donner Pass Road. The reduced traffic levels would allow Donner Pass Road to remain as a two-lane arterial. No development in PC-2 results in reduced impacts on State Route 89 (north) and at the State Route 89/267 and Interstate 80 interchange. No development on the Joerger Property results in lower traffic volumes on the State Route 267 bypass, but causes increased traffic on State Route 89 (south), State Route 267, Donner Pass Road and West River Road.

The circulation network alternative analysis results are presented in Table XV (roadway segment) and Table XVI (intersection). The following describes the results:

- Deerfield Drive connector - The completion of this facility results in lower traffic volumes at the S.R. 89/Deerfield Drive intersection and on S.R. 89 north of Deerfield Drive. Higher traffic volumes are experienced at the Donner Pass Road/Cold Stream

Road-I-80 eastbound ramps intersection. The system-wide impacts of this facility are minimal.

- Downtown Connector - This facility would provide a alternative connection to downtown Truckee. It results in lower traffic volumes on Northwoods Boulevard, S.R. 267 east of downtown to Interstate 80 and on Commercial Row. Increases in traffic are expected on Bridge Street and at the Commercial Row/Bridge Street intersection. With additional development north of Interstate 80 this facility would aid in system-wide traffic flow.
- Tahoe Donner Connector - This facility would provide a connection from Northwoods Boulevard to S.R. 89 at or near Prosser Dam Road. This facility results in lower traffic volumes on Northwoods Boulevard (2,270 v.p.h. vs. 1,310 v.p.h.), Donner Pass Road-east of Northwoods Boulevard (3,025 v.p.h. vs. 2,040 v.p.h.), Commercial Row (1,900 v.p.h. vs. 1,720 v.p.h.) and S.R. 267-east of downtown to Interstate 80 (2,270 v.p.h. vs. 1,900 v.p.h.). With or without the downtown connector this facility has a significant positive impact on overall town circulation.
- S.R. 267 Bypass - With this facility traffic decreases as projected on existing S.R. 267, West River Road, Commercial Row and S.R 89.



TABLE XIII ROADWAY SEGMENT ANALYSIS-LAND USE ALTERNATIVE COMPARISON

Roadway	Existing		No Project		Low Growth		GP Minus PC-2		GP Minus PC-1		GP Minus Joerger		GP PC-1 as Hotel		General Plan	
	Volume	Lanes	Volume	Lanes	Volume	Lanes	Volume	Lanes	Volume	Lanes	Volume	Lanes	Volume	Lanes	Volume	Lanes
I-80 (w/o Donner Lake Rd)	2,440	4F	2,920	4F	4,120	4F	4,250	4F	4,240	4F	4,440	4F	4,270	4F	4,300	4F
I-80 (w/o Donner Pass-west)	2,500	4F	2,990	4F	4,200	4F	4,400	4F	4,390	4F	4,580	4F	4,400	4F	4,460	4F
I-80 (w/o S.R. 267/89)	2,810	4F	3,520	4F	5,030	4F	5,190	4F	5,070	4F	5,700	4F	5,120	4F	5,300	4F
I-80 (e/o Truckee Airport Rd)	2,400	4F	2,860	4F	4,160	4F	4,420	4F	4,420	4F	4,600	4F	4,410	4F	4,470	4F
S.R. 267 (s/o I-80)	1,020	2H	1,010	2H	1,790	4H	1,670	2H	1,940	4H	2,000	4H	1,940	4H	1,900	4H
S.R. 267 (s/o Commercial Row)	1,310	2H	850	2H	2,680	4H	2,990	4H	2,960	4H	2,380	4H	2,940	4H	2,900	4H
S.R. 267 (n/o Tahoe-Truckee Airport)	920	2H	460	2H	1,060	2H	1,310	2H	1,330	2H	1,410	2H	1,310	2H	1,280	2H
Extend of SR 89 (s/o Donner Pass Rd)	1,300	4H	1,310	4H	1,660	4H	1,740	4H	1,800	4H	2,520	4H	1,770	4H	1,660	4H
S.R. 89 (s/o I-80)	1,490	4H	1,700	4H	2,050	4H	2,290	4H	2,240	4H	3,380	4H	2,230	4H	2,320	4H
S.R. 89 (s/o W. River Rd)	1,000	2H	1,160	2H	2,260	4H	2,310	4H	2,310	4H	2,430	4H	2,320	4H	2,360	4H
S.R. 89 (n/o I-80)	530	2H	810	2H	1,030	2H	1,400	4H	2,340	4H	2,050	4H	2,330	4H	2,300	4H
S.R. 89 (n/o Prosser Dam Rd)	190	2H	570	2H	570	2H	490	2H	610	2H	640	2H	610	2H	610	2H
Donner Pass (w/o Donner Lake Rd)	350	2A	400	2A	800	2A	850	2A	860	2A	920	2A	840	2A	870	2A
Donner Pass (w/o Cold Stream)	810	2A	860	2A	1,700	4A	1,780	4A	1,720	2A	2,010	4A	1,710	2A	1,780	2A
Donner Pass (w/o Northwoods Blvd)	800	2A	890	2A	1,700	4A	1,950	4A	1,500	2A	2,070	4A	1,560	2A	1,740	2A
Donner Pass (e/o Extend of S.R. 89)	890	2A	790	2A	1,180	2A	1,190	2A	1,250	2A	1,930	4A	1,220	2A	1,440	2A
Commercial Row (w/o S.R. 267)	1,100	2A	1,100	2A	1,630	2A	1,340	2A	1,290	2A	1,940	4A	1,290	2A	1,720	4A
Northwoods Blvd (n/o Donner Pass)	780	2C	1,170	4A	1,310	4A	1,390	4A	1,340	4A	1,350	4A	1,330	4A	1,360	4A
Glenshire Dr (e/o S.R. 267)	580	2C	780	2C	1,410	2A	1,560	2A	1,590	2A	1,240	2A	1,590	2A	1,590	2A
Prosser Dam Rd (e/o S.R. 89)	60	2C	80	2C	220	2C	120	2C	250	2C	150	2C	250	2C	250	2C
Deerfield Dr (w/o S.R. 89)	1,100	2C	1,160	2C	1,260	2A	1,300	2A	1,340	2A	2,440	4A	1,300	2A	1,280	2A
West River Rd (e/o S.R. 89)	810	2A	820	2A	1,700	4A	1,840	4A	1,940	4A	2,150	4A	1,920	4A	1,910	4A
Bridge St (n/o Commercial Row)	50	2C	50	2C	720	2C	740	2C	810	2C	710	2C	820	2C	800	2C
Tahoe Donner Connector	--	--	--	--	1,290	2A	1,320	2A	1,410	2A	1,180	2A	1,410	2A	1,380	2A
S.R. 267 Bypass (n/o S.R. 267)	--	--	670	2F	1,700	2F	2,130	2F	2,160	2F	1,570	2F	2,160	2F	2,130	2F
S.R. 267 (s/o S.R. 267 bypass)	730	2H	1,120	2H	3,280	4H	3,440	4H	3,490	4H	2,980	4H	3,470	4H	3,490	4H

Notes: F = Freeway H = Highway A = Arterial C = Collector L = Local

TABLE XIV P.M. PEAK HOUR INTERSECTION LEVEL OF SERVICE -LAND USE ALTERNATIVE COMPARISON

[illegible]

TABLE XV ROADWAY SEGMENT ANALYSIS-CIRCULATION NETWORK ALTERNATIVE COMPARISON

Roadway	All Roads		No Deerfield		No Downtown Connector		No Tahoe Donner Connector		No S.R. 267 Bypass	
	Volume	Lanes	Volume	Lanes	Volume	Lanes	Volume	Lanes	Volume	Lanes
I-80 (w/o Donner Lake Rd)	4,280	4F	4,300	4F	4,300	4F	4,310	4F	4,300	4F
I-80 (w/o Donner Pass-west)	4,420	4F	4,460	4F	4,460	4F	4,460	4F	4,430	4F
I-80 (w/o S.R. 267/89)	5,280	4F	5,340	4F	5,300	4F	5,810	4F	4,880	4F
I-80 (e/o Truckee Airport Rd)	4,440	4F	4,470	4F	4,470	4F	4,460	4F	4,460	4F
S.R. 267 (s/o I-80)	1,890	4H	2,140	4H	2,380	4H	2,270	4H	2,730	4H
S.R. 267 (s/o Commercial Row)	2,890	4H	2,900	4H	2,740	4H	2,790	4H	4,780	6H
S.R. 267 (n/o Tahoe-Truckee Airport)	1,310	2H	1,280	2H	1,170	2H	1,190	2H	2,930	4H
Extend of S.R. 89 (s/o Donner Pass)	1,460	4H	1,640	4H	1,720	4H	2,280	4H	1,830	4H
S.R. 89 (s/o I-80)	2,120	4H	2,590	4H	2,320	4H	2,370	4H	2,550	4H
S.R. 89 (s/o W. River Rd)	2,330	4H	2,360	2H	2,360	2H	2,370	2H	2,400	2H
S.R. 89 (n/o I-80)	2,070	4H	2,300	4H	2,380	4H	2,160	4H	2,030	4H
S.R. 89 (n/o Prosser Dam Rd)	610	2H	610	2H	610	2H	710	2H	590	2H
Donner Pass (w/o Donner Lake Rd)	840	2A	870	2A	870	2A	870	2A	870	2A
Donner Pass (w/o Cold Stream)	1,740	2A	1,770	4A	1,780	4A	1,780	4A	1,740	4A
Donner Pass (w/o Northwoods Blvd)	1,750	2A	1,980	4A	1,740	4A	1,750	4A	1,580	2A
Donner Pass (e/o Extend of S.R. 89)	1,250	2A	1,240	2A	1,280	2A	1,550	2A	1,190	2A
Commercial Row (w/o S.R. 267)	1,370	4A	1,750	4A	1,800	4A	1,900	4A	2,110	4A
Northwoods Blvd (n/o Donner Pass)	1,310	4A	1,350	4A	1,460	4A	2,270	4A	1,350	2A
Glenshire Dr (e/o S.R. 267)	1,590	2A	1,580	2A	1,580	2A	1,580	2A	1,540	2A
Prosser Dam Rd (e/o S.R. 89)	250	2C	250	2C	260	2C	260	2C	250	2C
Deerfield Dr (w/o S.R. 89)	970	2A	1,540	2A	1,280	2A	1,290	2A	1,340	2A
West River Rd (e/o S.R. 89)	1,830	4A	1,880	4A	1,850	4A	1,910	4A	2,170	4A
Bridge St (n/o Commercial Row)	540	2C	800	2C	80	2C	80	2C	930	2C
Tahoe Donner Connector	1,370	2A	1,380	2A	1,170	2A	--	--	1,340	2A
S.R. 267 Bypass (n/o S.R. 267)	2,080	2F	2,130	2F	2,280	2F	2,220	2F	--	--
S.R. 267 (s/o S.R. 267 bypass)	3,400	4H	3,500	4H	3,500	4H	3,500	4H	3,400	4H

Notes: F = Freeway H = Highway A = Arterial C = Collector L = Local

All volumes are p.m. peak hour summer traffic projections.



TABLE XVI P.M. PEAK HOUR INTERSECTION LEVEL OF SERVICE -CIRCULATION NETWORK ALTERNATIVE COMPARISON										
Intersection	All Roads		No Deerfield		No Downtown Connector		No Tahoe Donner Connector		No SR 267 Bypass	
	V/C, RC, Delay	LOS	V/C, RC, Delay	LOS	V/C, RC, Delay	LOS	V/C, RC, Delay	LOS	V/C, RC, Delay	LOS
1. I-80 eb/Donner Pass	> 90	F	> 90	F	> 90	F	> 90	F	> 90	F
2. I-80 wb/Donner Pass	-772	F	-906	F	-779	F	-782	F	-642	F
3. Northwoods/Donner Pass	0.95	E	0.98	E	0.98	E	1.26	F	0.89	E
4. SR 89/Donner Pass	0.96	E	0.91	E	1.16	F	1.15	F	0.96	E
5. SR 89/I-80 wb	-240	F	-248	F	-242	F	-246	F	-245	F
6. SR 89/I-80 eb	-197	F	-259	F	-190	F	-492	F	-152	F
7. SR 89/Deerfield	0.86	D	0.99	E	0.85	D	0.87	D	0.96	E
8. SR 89/W. River	-1184	F	-1171	F	-1160	F	-1192	F	-1303	F
9. I-80 wb (dwtm)/Donner Pass	79	E	77	E	43	E	-162	F	-244	F
10. I-80 eb (dwtm)/Donner Pass	-27	F	-60	F	-69	F	-92	F	-56	F
11. Commercial Row/Bridge	-1028	F	-1026	F	-1121	F	-1111	F	-1549	F
12. I-80 wb/SR 89 N	-830	F	-830	F	-1111	F	-1004	F	-836	F
13. I-80 eb/SR 89 N	-1000	F	-1004	F	-970	F	-1127	F	-683	F
14. SR 267/Glenshire	-812	F	-812	F	-807	F	-802	F	-788	F
15. SR 267/W. River	-1006	F	-983	F	-967	F	-1008	F	1214	F
16. SR 267 Bypass/SR 89 N	1.00	E	1.01	F	0.95	D	0.95	E	--	--
17. SR 89 N/Tahoe Donner	0.84	D	0.84	D	1.06	F	0.74	C	0.73	C
18. SR 267 Bypass/I-80 wb	0.79	C	0.79	C	0.81	D	0.78	C	--	--
19. SR 267 Bypass/I-80 eb	0.81	D	0.81	D	0.81	D	0.81	D	--	--
20. SR 267 Bypass/SR 267	0.73	C	0.73	C	0.76	C	0.76	C	--	--



TABLE XVII ROADWAY CHARACTERISTICS

Land Use Scenario	Milage by Roadway Type				
	4-Lane Freeway	2-Lane Freeway	6-Lane	4-Lane	2-Lane
No Project	9.3	1.5	--	0.4	30.8
Low Growth	9.3	1.5	--	5.5	29.5
GP minus PC 2	9.3	1.5	--	5.0	30.1
GP minus PC 1	9.3	1.5	--	5.0	30.1
GP minus Joerger	9.3	1.5	--	7.4	27.7
GP PC 1 as Hotel	9.3	1.5	--	5.0	30.1
General Plan	9.3	1.5	--	6.3	28.8
GP minus Deerfield	9.3	1.5	--	6.3	27.7
GP minus Downtown Connector	9.3	1.5	--	6.3	28.1
GP minus Tahoe Donner Connector	9.3	1.5	--	6.3	26.0
GP minus SR 267 Bypass	9.3	--	0.3	7.3	27.3

Note: All distances are approximate.

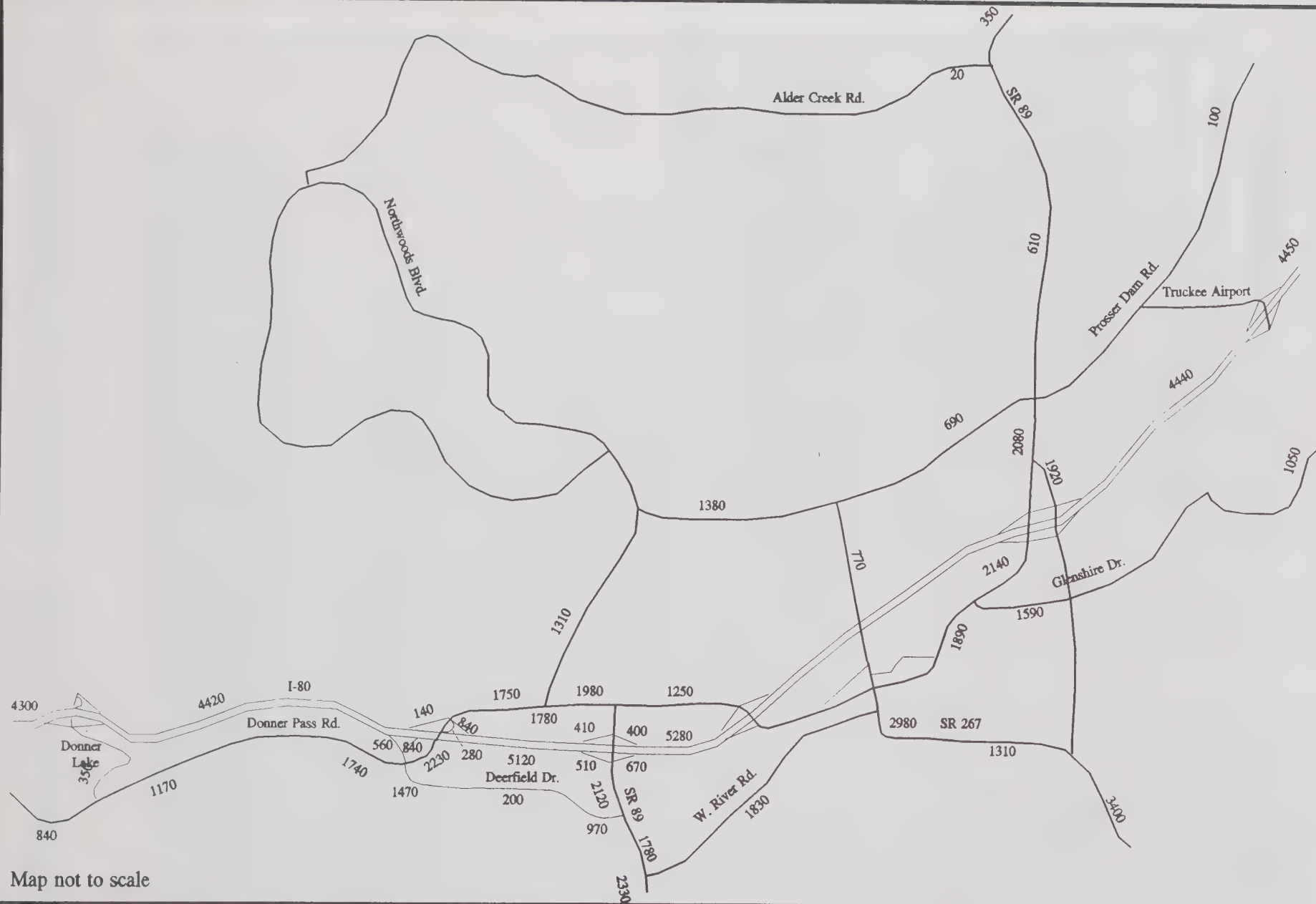
## FINAL DRAFT GENERAL PLAN ANALYSIS

An evaluation of the Final Draft General Plan land use plan was completed to provide data on the circulation system and necessary intersection improvements. The Final Draft General Plan land uses were based on changes made to the initial proposed General Plan by the Town Council in November of 1995. The traffic model was used to project future p.m. peak hour weekday summertime traffic data. Overall, the Final Draft General Plan resulted in lower traffic volumes and traffic impacts than the initial General Plan. This can be attributed to reduced land uses in PC-1, PC-2 and along Deerfield Drive. Figure 8 presents the Final Draft General Plan buildout p.m. peak hour traffic volumes for major street segments within the Town of Truckee.

Using the results of the traffic model, a intersection level of service analysis was completed for twenty study area intersections (See Figure 5). Using the standard methods of intersection analysis and existing traffic control and lane geometry, twelve intersections were identified as operating at unacceptable levels of service during the p.m. peak hour (see following list). Table XVIII provides a comparison of the intersection levels of service with and without traffic control and intersection lane geometry improvements.

- Interstate 80 westbound ramps/Donner Pass Road (LOS F)
- Interstate 80 eastbound ramps/Donner Pass Road (LOS F)
- Interstate 80 westbound ramps/State Route 89 South (LOS F)
- Interstate 80 eastbound ramps/State Route 89 South (LOS F)
- State Route 89 South/West River Street (LOS F)
- Northwoods Boulevard/Donner Pass Road (LOS E)
- Extension of State Route 89/Donner Pass Road (LOS F)
- Commercial Row/Bridge Street (LOS F)
- Interstate 80 westbound/State Route 89 North-State Route 267 (LOS F)
- Interstate 80 eastbound/State Route 89 North-State Route 267 (LOS F)
- State Route 267/Glenshire Drive (LOS F)
- State Route 267/West River Street (LOS F)

Based on Circulation Policy 1.6 of the Draft Final General Plan appropriate intersection improvements were determined and intersection levels of service calculated. With mitigation the number of intersections projected to be operating at unacceptable levels of service is reduced to two. Both of the intersections are within the downtown study area and are restricted as to the improvements that could be added to the intersections. The two intersections are: (see page 40)
















Map not to scale

PACTRANS

Final Draft General Plan -  
PM Peak Hour



Figure 8

1 I-80 EB & Donner Pass Rd.	2 I-80 WB & Donner Pass Rd.	3 Northwoods & Donner Pass Rd.	
			
Signal	Signal	Signal	
4 Donner Pass & S.R. 89S Extension	5 S.R. 89S & I-80 WB	6 S.R. 89S & I-80 EB	
			
Signal	Signal	Signal	
7 S.R. 89S & Deerfield	8 S.R. 89S & W. River	9 Donner Pass & I-80 EB (dntn)	
			
Signal	Signal		
10 Donner Pass & I-80 WB (dntn)	11 Commercial Row & Bridge	12 Old 267 & W. River	
			
	Signal	Signal	
PACTRANS	Turning Movements		FIGURE 9-A





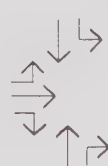



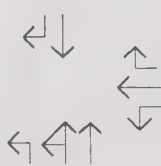
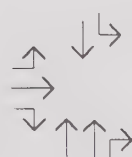

13 Old 267 & Glenshire	14 S.R. 89N & I-80 WB	15 S.R. 89N & I-80 EB	
 <p>Signal</p>	 <p>Signal</p>	 <p>Signal</p>	
16 S.R. 89N & Tahoe Donner Connector	17 S.R. 89N & S.R. 267	18 S.R. 267 Bypass & Old 267	
 <p>Signal</p>	 <p>Signal</p>	 <p>Signal</p>	
19 S.R. 267 Bypass & I-80 WB	20 S.R. 267 Bypass & I-80 EB		
 <p>Signal</p>	 <p>Signal</p>		
PACTRANS	Turning Movements		FIGURE 9-B

TABLE XVIII COMPARISON OF INTERSECTION LEVEL OF SERVICE-GENERAL PLAN

Intersection	Future Condition			
	No Mitigation		Mitigated	
	V/C, RC or Delay	Level of Service	V/C, RC or Delay	Level of Service
I-80 eb ramps/Donner Pass	> 90	F	0.88	D
I-80 wb ramps/Donner Pass	-789	F	0.83	D
Northwoods/Donner Pass	0.96	E	0.82	C
Extension of SR 89/Donner Pass	1.36	F	0.77	C
S.R. 89/I-80 wb ramps	-246	F	0.72	C
S.R. 89/I-80 eb ramps	-165	F	0.70	B
SR 89/Deerfield	0.71	C	0.71	C
S.R. 89/W. River	-1178	F	0.79	C
I-80 wb ramps/Donner Pass (dwtn)	79	E	796	E
I-80 eb ramp/Donner Pass (dwtn)	37	E	37	E
Commercial Row/Bridge	-1099	F	1.57	F
I-80 wb ramps/S.R. 89-267	-1068	F	0.76	C
I-80 eb ramps/S.R. 89-267	-597	F	0.80	C
S.R. 267/Glenshire	-366	F	0.76	C
S.R. 267/W. River	-1006	F	1.67	F
SR 89/Tahoe Donner Connector	0.57	A	0.57	A
SR 267 Bypass/SR 89	0.77	C	0.77	C
SR 267 Bypass/I-80 eb ramps	0.81	D	0.81	D
SR 267 Bypass/I-80 wb ramps	0.79	C	0.79	C
S.R. 267/Old SR 267	0.73	C	0.73	C

- Commercial Row/Bridge Street (LOS F)
- State Route 267/West River Street (LOS F)

Improvements needed to mitigate Final Draft General Plan buildout traffic impacts would include traffic signals at ten (10) existing intersections and at five (5) new intersections. Figure 9 presents the recommended traffic control and lane configurations at the twenty study intersections.

The same analysis was completed for the study area roadway segments. Table XIX presents the results of the roadway segment evaluation, with proposed mitigation. The results show that the following roadway segment is projected to be operating at a level of service E or worse:

● State Route 89 south of West River Road (LOS F)

TABLE XIX ROADWAY SEGMENT ANALYSIS-GENERAL PLAN (MITIGATED)				
Roadway (Location)	P.M. Peak Hour Traffic Volume	Roadway Classification	Number of Lanes	Level of Service
I-80 (w/o Donner Lake Rd.)	4,280	Freeway	4	C
I-80 (w/o Donner Pass Rd.)	4,420	Freeway	4	C
I-80 (w/o S.R. 267/89)	5,218	Freeway	4	D
I-80 (e/o Truckee Airport Rd.)	4,440	Freeway	4	C
S.R. 267 (s/o I-80)	1,890	Highway	4	A
S.R. 267 (s/o Commercial Row)	2,980	Highway	4	D
S.R. 267 (n/o Tahoe-Truckee Airport)	1,310	Highway	2	D
Extension of S.R. 89 (s/o Donner Pass Rd.)	1,460	Highway	4	A
S.R. 89 (s/o I-80)	2,120	Highway	4	C
S.R. 89 (s/o West River)	2,330	Highway	2	F
S.R. 89 (n/o I-80)	2,070	Highway	4	B
S.R. 89 (n/o Prosser Dam Rd.)	610	Highway	2	A
Donner Pass (w/o Donner Lake Rd.)	840	Arterial	2	B
Donner Pass (w/o Cold Stream Rd.)	1,740	Arterial	2	D
Donner Pass (w/o Northwoods)	1,750	Arterial	2	D
Donner Pass (e/o S.R. 89)	1,250	Arterial	2	D
Commercial Row (w/o S.R. 267)	1,370	Arterial	2	D
Northwoods Blvd (n/o Donner Pass)	1,310	Collector	4	C
Glenshire Dr (e/o S.R. 267)	1,590	Collector	2	D
Prosser Dam Rd. (e/o S.R. 89)	250	Collector	2	A
Deerfield Dr (w/o S.R. 89)	970	Arterial/Collector	2	C
West River Rd. (e/o S.R. 89)	1,830	Arterial	4	B

## **APPENDIX A**



## REFERENCES

- Baseline Environmental Consulting, Draft Environmental Impact Report Deerfield Bypass/Pioneer Village, February 1989.
- California Department of Transportation, Traffic Manual, 1990.
- California Department of Transportation, Highway Design Manual, 1990.
- Caltrans, District 3, Draft Environmental Impact Statement, Truckee Bypass, September 1989
- Caltrans, District 3, Visual Impact Assessment for the Truckee Bypass Route 267, July 1989.
- Caltrans, District 3, Project Development Team Meeting for Truckee Bypass Project, June 1993.
- Caltrans, District 3, Memo regarding Route 267 Truckee Bypass Development Team meeting, August 5, 1993.
- Caltrans, District 3, Route Concept Report State Route 89, December 1989.
- DKS Associates, Glenshire Area Traffic Study, December 1992.
- Eastern Nevada County General Plan Steering Committee, Nevada County General Plan Update, Eastern Nevada County Chapter Text, April 1992.
- Harland Bartholomew & Associates, Inc. Nevada County Corridor Management and Preservation Study, Technical Memorandum 1: Existing Data Inventory, September 1991.
- Harland Bartholomew & Associates, Inc. Nevada County Corridor Management and Preservation Study, Technical Memorandum 2: Corridor Operations Model Development, November 1991.
- Harland Bartholomew & Associates, Inc. Nevada County Corridor Management and Preservation Study, Technical Memorandum 3: Build out Conditions Analysis, February 1992.
- Harland Bartholomew & Associates, Inc. Working Paper Existing Transportation Conditions Analysis, August 1991.

Harland Bartholomew & Associates, Inc. Technical Memorandum: Traffic Model Validation Final Report, October 1991.

Institute of Transportation Engineers, Trip Generation, 5th Edition., 1990.

Leigh, Scott & Cleary, Inc., Eastern Nevada County Transit Development Plan Study, Final Report, March 10, 1993.

Nevada County Transportation Commission, Nevada County Regional Transportation Plan, 1990.

Omni-Means, Ltd., Traffic Impact Analysis for the Proposed Sierra Tahoe Bancorp Administration Center, July 1990.

Pacific Traffic and Transportation Engineers, Traffic Impact Analysis for the Proposed Expansion of the Joseph Government Annex Building, May 1991.

R/UDAT, North Tahoe/Truckee Resort Triangle, July 14-17, 1989.

TJKM Transportation Consultants, Traffic Impact Analysis for the Proposed Pioneer Village Development, April 1987.

Transportation Research Board, Interim Materials on Highway Capacity, Circular 212, 1980.

Transportation Research Board, Highway Capacity Manual, Special Report 209, 3rd ed., 1985.

Transportation Research Board, Interim Materials on Unsignalized Intersection Capacity, Circular 373, 1991.

Wilbur Smith Associates, Nevada County Rail Feasibility Study, Final Report, August 1991.



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**VOLUME II:  
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**Part 5 - Bibliography**





## ***BIBLIOGRAPHY***

---

Abbey Group, Truckee Fire Protection District Fire Capital Facilities Mitigation Analysis, November, 1994

Baseline Environmental Consulting, Draft Environmental Impact Report Deerfield Bypass/Pioneer Village, February 1989.

Benson, Gary L., Donald H. Behrens, Harley L. Greiman, Robert G. Lancaster, and Kathy Van Zuuk. 1990. Tahoe National Forest Sensitive Plant Program Standards and Guidelines. Tahoe National Forest.

Butler, Ray. 1989. Eastern Nevada County's Biotic Resources. Unpublished report. 18 pp.

California Department of Conservation, Division of Mines and Geology, Fault Map of California, 1975

California Department of Conservation, Division of Mines and Geology, Geologic Map of the Chico Quadrangle, Map #7A, 1992,

California Department of Conservation, Division of Mines and Geology, Special Report 164, Mineral Land Classification of Nevada County, California, 1990

California Department of Conservation, Division of Mines and Geology, Fault Rupture Hazard Zones in California Revised 1992, Special Publication 42

California Department of Fish and Game (CDFG). 1994. California Natural Diversity Data Base (CNDDB). Norden, Martis Peak, and Truckee quadrangles. August 1994.

California Department of Transportation, Highway Design Manual, 1990.

California Department of Transportation, Traffic Manual, 1990.

California Native Plant Society (James Smith and Ken Berg), Inventory of Rare and Endangered Vascular Plants of California

---

## ***BIBLIOGRAPHY***

---

Caltrans, District 3, Route Concept Report State Route 89, December 1989.

Caltrans, District 3, Truckee Bypass Deer Study, January 1990

Caltrans, District 3, Truckee Bypass Draft Environmental Impact Statement, September 1989,

Caltrans, District 3, Truckee Bypass Project, Memo regarding Route 267 Truckee Bypass Development Team meeting, August 5, 1993

Caltrans, District 3, Truckee Bypass Project, Project Development Team Meeting, June 1993

Caltrans, District 3, Visual Impact Assessment for the Truckee Bypass Route 267, July 1989

DKS Associates, Glenshire Area Traffic Study, December 1992.

Eastern Nevada County General Plan Steering Committee Conservation and Open Space Subcommittee, Eastern Nevada County's Biotic Resources, 1989

Eastern Nevada County General Plan Steering Committee, Nevada County General Plan Update, Eastern Nevada County Chapter Text, April 1992

Eastern Nevada County General Plan Steering Committee Public Review Report June 1992

Federal Emergency Management Agency (FEMA), Flood Insurance Rate Maps (FIRMs) for the area covering Truckee, January 19, 1983

Harland Bartholomew & Associates, Inc. (HB&A). 1991. Nevada County Master Environmental Inventory: Appendices, December 1991.

Harland Bartholomew & Associates, Inc., Draft Nevada County General Plan, August 1993

Harland Bartholomew & Associates, Inc., Nevada County Corridor Management and Preservation Study, Technical Memorandum 2: Corridor Operations Model Development, November 1991

---

## ***BIBLIOGRAPHY***

---

Harland Bartholomew & Associates, Inc., Nevada County Corridor Management and Preservation Study, Technical Memorandum 3: Buildout Conditions Analysis, February 1992

Harland Bartholomew & Associates, Inc., Nevada County Corridor Management and Preservation Study, Technical Memorandum 1: Existing Data Inventory, September 1991

Harland Bartholomew & Associates, Inc., Nevada County General Plan Final Draft, March 1994

Harland Bartholomew & Associates, Inc., Technical Memorandum: Traffic Model Validation Final Report, October 1991

Harland Bartholomew & Associates, Inc., Technical Memorandum: Traffic Model Validation Final Report, October 1991.

Harland Bartholomew & Associates, Inc., Working Paper Existing Transportation Conditions Analysis, August 1991.

Hydro-Search Inc., Truckee-Donner PUD Groundwater Management Plan Phase 1, Martis Valley Ground-Water Basin Basin No. 6-67, Nevada and Placer Counties, California, January 31, 1995

Institute of Transportation Engineers, Trip Generation, 5th Edition., 1990.

John Cone, Land Use Projections for the Truckee Community, June 1989

Leigh, Scott & Cleary, Inc., Eastern Nevada County Transit Development Plan Study, Final Report, March 10, 1993.

Letter from the state Department of Conservation on soils and faults in Truckee, April 25, 1989

*Market Analysis and Development Forecasts for Nevada County*, April 4, 1994, Memo from Robert Spencer of Recht Hausrath to Thomas Miller

McEwan, Dennis R., John M. Deinstadt, and Russell Wickwire. Survey of Fish Populations in



## ***BIBLIOGRAPHY***

---

Streams of the Truckee and Carson River Drainages: 1983. California Department of Fish and Game. Inland Fisheries Administrative Report No. 86-1. February 1986.

Meschery, Joanne, Truckee: An Illustrated History of the Town and Its Surroundings. Rocking Stone Press, Truckee, California 1978.

Nevada County, Eastern Nevada County Transit Development Plan Study - March 1993

Nevada County General Plan Administrative Draft - December 1992

Nevada County General Plan Background and Data Analysis - August 1993

Nevada County General Plan Designation (GPD) Evaluation - August 1993

Nevada County General Plan - Hearing Copy, September 1993

Nevada County General Plan Update, Eastern Nevada County Chapter Text - May 6, 1992

Nevada County LAFCO, Comprehensive Fiscal Analysis for the Town of Truckee, Jan Hagel, June 25, 1992

Nevada County, Martis Valley General Plan

Nevada County, Master Environmental Inventory

Nevada County, Master Environmental Inventory - Appendices, December 1991

Nevada County Transportation Commission, Nevada County Regional Transportation Plan, 1990.

Nevada County Transportation Commission, Nevada County Regional Transportation Plan, 1990

North Lahonton Current Basin Plan, Draft November 1993, Lahonton Water Quality Control Board

## ***BIBLIOGRAPHY***

---

Omni-Means, Ltd., Traffic Impact Analysis for the Proposed Sierra Tahoe Bancorp Administration Center, July 1990.

Pacific Traffic and Transportation Engineers, Traffic Impact Analysis for the Proposed Expansion of the Joseph Government Annex Building, May 1991.

PacTrans, Town of Truckee Transportation Model, April 1994

Pencovic, Terri A. and Carolyn L. Brown. 1990. Truckee Bypass Deer Study. Caltrans report No. 03-Nev-267-0.0/R2.8. January 26, 1990.

R/UDAT, North Tahoe/Truckee Resort Triangle, July 14-17, 1989

Route Concept Report State Route 89, December 1989, Caltrans, District 3

Russo, Marianne L. 1994. North Central Information Center, California Archaeological Inventory and Historical Resources File System, Sacramento, California. Letter to The Planning Center dated May 18, 1994.

Tahoe Forest Hospital Master Plan - January 11, 1994

Tahoe National Forest Land and Resource Management Plan and EIS

Tahoe Truckee Unified School District, Developer Fee Justification Study/Capital Improvement Plan, March 1994

The Planning Center, Town of Truckee Technical Noise Study, May 1994

TJKM Transportation Consultants, Traffic Impact Analysis for the Proposed Pioneer Village Development, April 1987.

Town of Truckee Historic Preservation District Design Guidelines

---



## ***BIBLIOGRAPHY***

---

Town of Truckee Zoning Ordinance and Maps

Transportation Research Board, Highway Capacity Manual, Special Report 209, 3rd ed., 1985.

Transportation Research Board, Interim Materials on Highway Capacity, Circular 212, 1980.

Transportation Research Board, Interim Materials on Unsignalized Intersection Capacity, Circular 373, 1991.

Truckee Design Guidelines - October 1993

Truckee Donner PUD Electric System Preliminary Master Plan

Truckee Donner PUD Water System Master Plan, August 1991

Truckee Sanitary District 1995 Plan - November 1982

Truckee Sanitary District Wastewater Master Plan 2000 - February 16, 1995

Truckee Tahoe Airport District, Airport Master Plan - December 1988

Truckee Tahoe Airport District Comprehensive Land Use Plan

Truckee-Donner Recreation and Park District Ten Year Master Plan 1990-2000

U.S. Bureau of Reclamation Seismotectonic Study of Truckee/Lake Tahoe Area

U.S. Geologic Survey Topographic Maps

Undated, untitled guidebook to Truckee (circa 1910-1920 ?)

Wilbur Smith Associates, Nevada County Rail Feasibility Study. Final Report, August 1991.

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